Desert View Power LLC, an affiliate of

Greenleaf POWER

January 25, 2021

Scott Connolly
Environmental Engineer, Enforcement and Compliance Assurance Division
75 Hawthorne St. (ENF-2-1)
San Francisco, CA 94105

Subject: Compliance Testing at Desert View Power
Permit No. CB-ROP 05-01
NSR 4-4-11; SE 87-01

Dear Mr. Connolly,

This letter is to inform you of the Intent to Test for annual emissions compliance testing on the two Fluidized Bed Boilers of the Desert View Power (DVP) facility. Additionally, we will be conducting our annual RATA of the continuous monitoring system (CEMS) during this time frame.

Please note that we plan to use EPA test Method 321 for HCI compliance during this test period. See attached Montrose Air Quality Services.

Attached is the test plan from our test contractor Montrose Air Quality Services of Santa Ana, California. Test plan # W002AS-006514-PP-276.Our tentative compliance test dates and relative accuracy tests are 3/3/2021 through 3/11/2021.

Please call if you have any comments or questions on this test plan and Intent to Test.

Best Regards,

Jim Robertson
Plant Manager
Desert View Power
62-300 Gene Welmas Drive
Mecca, CA 92554

CC Mr. Kenneth Dudash, South Coast Air Quality Management District
Mr. Andrew Chew, U.S. EPA, Region 9

MONTROSE
AIR QUALITY SERVICES

TEST PLAN FOR 2021 EMISSIONS PERFORMANCE TESTING AT THE DESERT VIEW POWER PLANT

Prepared For:

Desert View Power
62-300 Gene Welmas Dr.
Mecca, California 92254-0758

For Submittal To:

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765-4178

Prepared By:

Montrose Air Quality Services, LLC
1631 E. St. Andrew PL.
Santa Ana, California 92705
(714) 279-6777

Dave Wonderly

Production Date: **January 22, 2021**
Document Number: **W002AS-006514-PP-276**

STAC STACK TESTING ACCREDITATION COUNCIL
ACCREDITED TO ASTM D7036 ONLY CERT #3925.01

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CONFIDENTIALITY STATEMENT

Except as otherwise required by law or regulation, this information contained in this communication is intended exclusively for the individual or entity to which it is addressed. This communication may contain information that is proprietary, privileged or confidential or otherwise legally exempt from disclosure. If you are not the named addressee, you are not authorized to read, print, retain, copy, or disseminate this message or any part of it.

REVIEW AND CERTIFICATION

I certify that, to the best of my knowledge, the information contained in this document is complete and accurate and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature: _____ Date: 1/22/2021

Name: Dave Wonderly Title: Client Project Manager

I have reviewed, technically and editorially, details and other appropriate written materials contained herein. I hereby certify that to the best of my knowledge the presented material is authentic and accurate and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature: _____ Date: 1/22/2021

Name: Matt McCune Title: Regional Vice President

TABLE OF CONTENTS

1.0 INTRODUCTION

Montrose Air Quality Services, LLC (MAQS) has been contracted by Desert View Power to conduct annual emissions compliance testing on two Fluid Bed Boilers, and a relative accuracy test audit (RATA) of the continuous emissions monitoring system (CEMS) at the Desert View Power Plant located in Mecca, California. MAQS will conduct testing to comply with U.S. Environmental Protection Agency Part 71 Operating Permit No. CB-ROP 05-01 NSR 4-4-11; SE 87-01 including amendments through September, 2020: and 40 CFR 60, Appendix F. This test plan presents the testing procedures, a description of the sample locations and a summary of quality assurance procedures.

David Wonderly will coordinate the testing for MAQS and can be reached at (714) 279-6777. The on-site test team will consist of a Project Manager whose responsibilities include interfacing with facility personnel, operating the mobile emission measurement laboratory, and performing data entry as well as Technician(s) responsible for all stack responsibilities. A Qualified Individual, as defined in ASTM D7036-04, will be on-site for all methods performed.

Emissions tests will be performed on each Biomass fired boiler as specified in the permit for:

- Particulate
- NO_x, CO and SO_2
- Hydrocarbons
- Hydrogen Chloride (HCl)
- Mercury (Hg)
- Method 19 F-Factor Using ASTM D6323 and ASTM E711 for Fuel Btu/lb
- Volumetric Flow Rate
- Oxygen and Carbon Dioxide concentration
- Flue gas moisture content

A relative accuracy test audit will be performed to satisfy the requirements of 40 CFR 60, Appendix F, as part of the quarterly CEMS testing. The Continuous Emissions Monitoring System (CEMS) Relative Accuracy Test Audit includes NO_x, CO and SO_2.

2.0 UNIT DESCRIPTION

The Desert View Power Plant consists of two circulating bed, biomass-fired boilers, and combined unit are designed to produce 47 MW of net electrical output. Each unit is equipped with the following pollution control systems:

- An ammonia injection system for control of NO_x emissions;
- Cyclonic mixing of injected ammonia with flue gas to provide for a minimum amount of ammonia slip (emission);
- A limestone injection system to limit emissions of SO_2;
- A hydrated lime injection system to limit emissions of HCL;
- A reverse air baghouse to restrict opacity and emissions of sulfates and particulate to very low levels.

The plant CEM system for each unit includes measurements of NO_x, O_2 dry, O_2 wet, CO_2, CO, SO_2, flow, and opacity. It is an extractive system with a heated line extending from the probe to the CEM unit. Table 2-1 presents the current CEMS configuration.

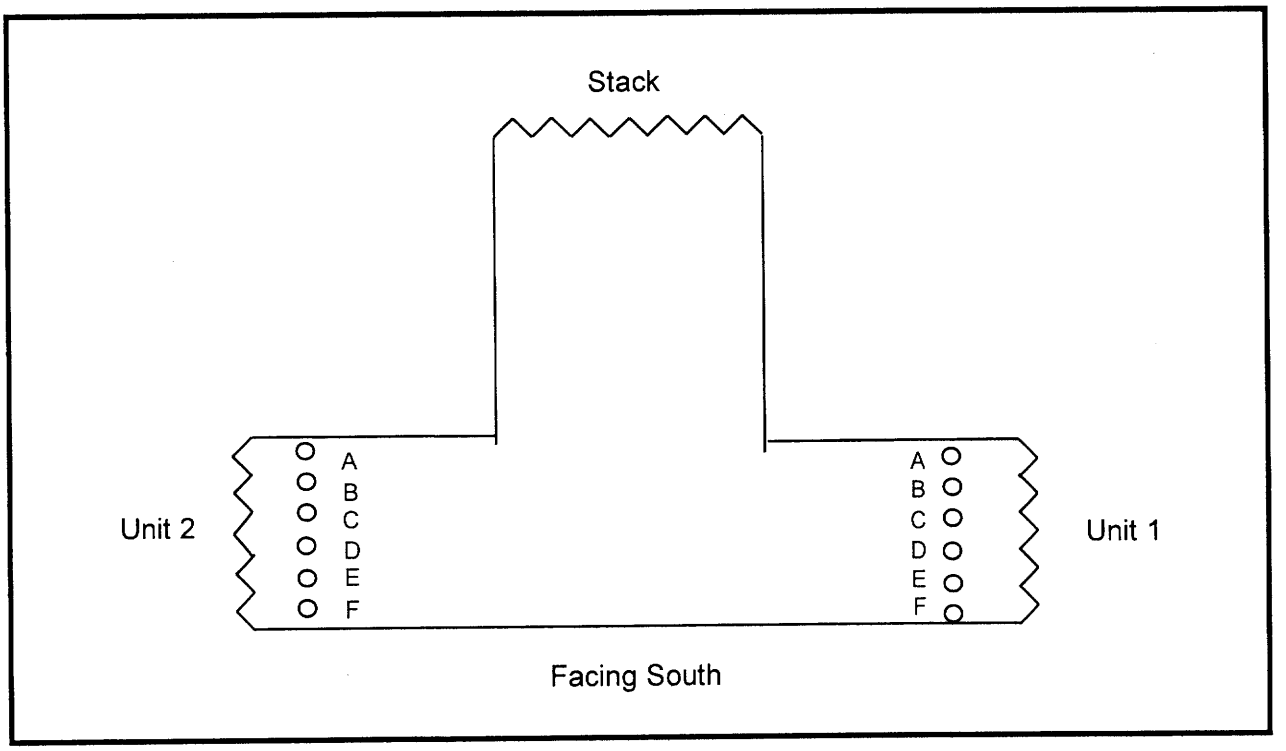
TABLE 2-1
CONTINUOUS EMISSION MONITOR SYSTEM
DESERT VIEW POWER PLANT

Species	Manufacturer	Model	Range
NO_x	CAI	ZRE-5 Multi Component Analyzer	100 and 500 ppm
O_2 Dry	CAI	ZRE-5 Multi Component Analyzer	25%
O_2 Wet	AMETEK	Thermox 2000	25%
CO_2	CAI	ZRE-5 Multi Component Analyzer	20%
CO	CAI	ZRE-5 Multi Component Analyzer	100 and 500 ppm
SO_2	CAI	ZRE-5 Multi Component Analyzer	50 and 500 ppm
Flow	Diet Greg Standard	--	Msdcfh
Opacity	Monitor Labs	Lighthawk 560	100%

2.1 SAMPLE LOCATIONS

Samples will be collected from the transition ducts to the stack. Carnot Technical Services, Inc. conducted three dimensional flow testing and stratification testing on the transition exhaust ducts on each unit. This testing was conducted in accordance to SCAQMD chapter X section 1 and 13 and will be presented in the report titled "Stack Gas Stratification and Absence of Flow Disturbance Testing at Desert View Power Mecca Project" (R106E622.T) submitted to SCAQMD in October of 1994. The sample locations met all the requirements. Copies of the results from that report can be found in Appendix B. All testing for both Unit 1 and 2 will be done at the sample location presented in Figure 2-1.

FIGURE 2-1
DESERT VIEW POWER SAMPLE LOCATION



2.2 UNIT OPERATION

The tests will be conducted at or near maximum steady state unit load conditions. Limestone injection rate, fuel combustion rate, ammonia injection rate, ash handling operations, excess air level, combustion air distribution, and combustion temperature will all be set to maintain stable unit operation. Pertinent operating conditions will be recorded by Desert View Power personnel during the tests. Full load is defined as 23 MW per unit of total net electrical generation.

3.0 TEST PROCEDURES

The test procedures to be used are listed in Table 3-1. Part of the gaseous plant emissions performance testing data will be used for CEMS RATA determinations. A minimum of nine reference method tests are required for all gaseous species relative accuracy (RA) determinations.

TABLE 3-1
PROPOSED TEST MATRIX PER UNIT
DESERT VIEW POWER MECCA PROJECT

Parameter	No. of Tests	Limits	Measurement Principle	Reference Method	Duration per Test
NO_x	9(1)	30.0 lb/hr or 94 ppm @ 3% O_2(2)	Chemiluminescence	EPA 7E	60/30 minutes
O_2/CO_2	9(1)		Non-Dispersive Infrared	EPA 3A	60/30 minutes
CO	9(1)	13.0 lb/hr or 231 ppm, dry, @ to 3% O_2(2)	Non-Dispersive Infrared	EPA 10	60/30 minutes
SO_2	9(1)	12.0 lb/hr or 27 ppm, dry, @ to 3% O_2(2)	Barium Thorin Titration	EPA 6	60/30 minutes
PM	3	3.9 lb/hr or 0.006 gr/dscf @ 12% CO_2(2)(3)	Gravimetric	EPA 5	120 minutes
Hydrocarbons	2	5.9 lb/hr	GC/FID	SCAQMD 25.3	60 minute composite
HCL	3	0.022 lb per MMBtu	FTIR	EPA 321	120 minutes, minimum of 2 DSCM of sample volume
Mercury	3	5.7E-06 lb per MMBtu		EPA 30B	60 minutes
Fuel Sampling	Daily			ASTM D6323	Composite hourly samples
Fuel Btu/lb	Daily			ASTM E711	Composite hourly samples
Fuel Moisture	Daily			ASTM D3173	Composite hourly samples
Fuel Chlorine	Daily			ASTM E776	Composite hourly samples
Stack Gas Flow Rate	--		S-Type Pitot Traverse	EPA 2	--
Moisture	--		Condensation/Gravimetric	EPA 4	--

(1) Includes compliance and RATA test runs.
(2) The more stringent of the 2 limits apply
(3) All PM as measured by EPA Method 5 will be considered to be PM_{10}

3.1 CONTINUOUS GASEOUS MEASUREMENTS

NO_x, O_2, CO_2 and CO will be measured according to EPA reference methods using MAQS continuous emissions monitoring system (CEM). NO_x, O_2, CO_2 and CO concentrations will be determined using MAQS mobile emission measurement laboratory. The laboratory is housed in an 18 foot trailer outfitted to provide a clean, quiet, environmentally controlled base for the testing operations. The laboratory has lighting, electrical distribution, air conditioning and heating to support the test instruments and provide for optimal test performance.

Concentrations of these gaseous species are measured using an extractive sampling system consisting of a heated stainless steel probe to minimize reactions, a heat traced Teflon sample line connected to a thermo-electrically cooled sample dryer. Following the dryer, the sample is drawn into a Teflon lined pump where it is pressurized and then filtered for delivery to the gas analysis portion of the system. Gaseous samples will be collected at a single point. Three minimum 60-minute compliance tests will be performed.

NO_x concentration is determined using a California Analytical Instruments (CAI) chemiluminescence analyzer (model 600 Series). The analyzer has full scale ranges from 2.5 to 10,000 ppm. The analyzer is equipped with a vitreous carbon NO_2 - NO converter for the determination of total nitrogen oxides without interference from other nitrogen containing compounds.

Oxygen concentration is determined using a AMI electro-chemical cell analyzer (model # 201). The analyzer has three full scale ranges; 0-5%, 10%, and 25%. The cell contains an electrolytic fluid that reacts with oxygen to generate an electrical signal proportional to the concentration.

CO_2 is measured using a non-dispersive infrared analyzer manufactured by CAI (model # 100 Series). The analyzer has full scale ranges of 0-5%, 10%, 20% and 40%.

CO is measured using a non-dispersive infrared/gas filter correlation analyzer manufactured by TECO (model # 48i). The analyzer has user definable full scale ranges from of 0-10 to 0-10,000 ppm.

The analyzers and sampling system are subjected to a variety of calibration and quality assurance procedures including leak checks, linearity and calibration error determinations before sampling, and system bias and drift determinations as part of each test run. Data are corrected for any observed bias or drift in accordance with the reference methods.

3.2 PARTICULATE MEASUREMENTS

EPA Method 5 sampling system will be used to measure the particulate emissions from both Desert View Power units. The sampling system consists of a nozzle, glass probe, 250°F heated filter, two impingers containing DI water, a third empty impinger and a fourth impinger containing silica gel.

The analysis for particulate is summarized in Table 3-2. Gravimetric Analysis will be performed on the probe/nozzle wash and filter.

TABLE 3-2
EPA METHOD 5 ANALYSES

Sample Component	Analysis Procedure
Probe and Nozzle (Front 1/2)	Evaporation/gravimetric
Heated Filter (83 mm)	Bake/gravimetric

3.3 SULFUR DIOXIDE

Sulfur dioxide will be measured according to EPA Method 6 instead of EPA Method 8. All measured SO_x will be considered to be SO_2. The first three runs will be 60 minutes and will be used to demonstrate compliance and potentially as RATA runs. Subsequent RATA runs will consist of 30 minute tests per the Methods. A barium thorin titration of the hydrogen peroxide impinger samples will yield SO_2 concentrations for nine relative accuracy test runs. The sample system will consist of a heated glass probe connected to the impinger train with an un-heated Teflon sample line. All the unheated portion of the sample train will be recovered and analyzed. Prior to the titrimetric analysis, all SO_x samples will pass through an ion exchange resin. This removes interference associated with ammonium (NH_{4+}). The Method 6 train will not include the IPA impinger, which is provided in the method as an option. The H_2O_2 will absorb both SO_2 and SO_3 (if any). SO_3 will be considered as SO_2.

3.4 HYDROCARBON

Samples for hydrocarbon analysis will be collected in clean 6-L Summa Canister and mini water impingers and analyzed according to SCAQMD 25.3. The samples will be analyzed by AtmAA Inc. in Calabasas, California or other qualified laboratory using TCA/FID. Results will be reported as total non-methane hydrocarbons as carbon.

3.5 HYDROGEN CHLORIDE MEASUREMENTS

Triplicate, 60-minute hydrogen chloride (HCl), measurements will be performed using EPA Method 321. In this method HCl concentrations are measured by Fourier Transform Infrared (FTIR) Spectroscopy. Concurrent stack flow measurements using EPA Methods 1-4 will be performed to calculate mass emissions of HCL. The sampling train consists of:

- A heated SS probe heated to 375°F
- A borosilicate, out-of-stack filter in a SS holder heated to 375°F
- Heated Teflon transfer line heated to 375°F
- Heated diaphragm pump heated to 375°F
- MKS 2030 FTIR analyzer, maintained at 375°F

Quality assurance samples collected in the field are:

- HCl analyte spiking pre and post each test run
- Calibration Transfer Standard (CTS) system purge pre & post each test run
- N2 (zero gas) system purge to determine system bias

3.6 MERCURY

Triplicate one-hour mercury test runs will be conducted at the sample location using EPA Method 30B. Each test run will include two pairs of concurrent samples – two sets of sorbent tubes co-located at the tip of the sampling probe. One set will be conducted using a "spiked" sorbent trap paired with an "un-spiked" sorbent trap. These runs will be used to for quality assurance purposes.

Method 30B collects vapor phase mercury on carbon sorbent traps. Testing for total mercury uses a two-stage sorbent trap, each stage analyzed separately to confirm that there was no significant "breakthrough" or sample loss. Each of the two sets of traps will be placed at the tip of a probe, both tube sets and probes in a single air-cooled probe assembly to maintain a temperature of approximately 220-230°F. The temperature will be maintained to ensure mercury adsorption and prevent mercury breakthrough. Samples will be drawn through the paired probes using an Apex mercury control/meter box. The trap sets will therefore be arranged in parallel and connected to two parallel moisture removal systems and two separate dry gas meters contained in the control box.

Each sorbent trap set will be leak-checked before and after each test run, and the sampling volume and associated parameters will be recorded for each trap set.

The following quality assurance requirements will be used for a test run to be considered valid:

- Results agreement for each pair of traps: ≤ 10% Relative Deviation,
- Sorbent trap section 2 breakthrough; mercury mass found in Section 2 ≤ 10% of mercury mass in Section 1,

Field recovery test: Recovery between 85% and 115% for elemental mercury spike (based on paired samples, one of which is spiked with a known level of mercury).

3.7 VELOCITY AND MOISTURE

Stack gas velocity and moisture content will be determined by EPA Methods 2 and 4 during the particulate test. Velocity traverses will be performed during each set of compliance tests (NO_x, CO, SO_2 and hydrocarbons) and for each RATA run.

3.8 FUEL ANALYSIS

Daily fuel samples will be collected by Desert View Power personnel. Hourly samples will be taken and composited by the lab prior to analysis. Sampling will be consistent with ASTM D6323 sample collection methodology. MAQS will send the samples out to be analyzed for higher heating value for heat rate calculations, for Btu/lb for calculating the HCL emissions in lb/MMBtu using ASTM E711, for moisture content using ASTM D3173 and for chlorine content using ASTM E776. Copies of the analysis will be included with the final report.

3.9 RELATIVE ACCURACY TEST AUDIT

Relative Accuracy tests will be performed for NO_x, O_2, CO, and SO_2 on sub systems of each unit's CEMS. Relative accuracy is determined by comparing the CEMS data to the corresponding reference method (RM) data over nine to twelve test runs. Nine 30-minute minimum tests will be performed for the NO_x, O_2, CO, and SO_2 relative accuracy. Relative accuracy is expressed in terms of the absolute value of the mean of the difference between the monitor value and the reference method value. It is reported in terms of a percentage of the mean reference method value. The computational procedure is summarized by the following equations:

$$\overline{RM} = \frac{1}{n} \sum_{i=1}^{n} RM_1$$

$$\overline{d} = \sum_{i=1}^{n} d_i$$

$$S_d = \left[\frac{\sum_{i=1}^{n} d_i^2 - \frac{\left(\sum_{i=1}^{n} d_i\right)^2}{n}}{n-1} \right]^{\frac{1}{2}}$$

$$CC = t_{0.975} \frac{S_d}{\sqrt{n}} 1$$

$$RA = \frac{|\overline{d}| + |cc|}{\overline{RM}} x100$$

The RA will be determined for the monitoring systems in parts per million dry (ppm) and lb/hr.

3.10 TEST SCHEDULE

The scheduled test dates have been set for March 4 – March 11, 2021 for compliance and RATA testing. A proposed test schedule for on-site testing activities is shown in Table 3-3. This schedule is based on the number of tests and the required sample times.

TABLE 3-3
PROPOSED TEST SCHEDULE
DESERT VIEW POWER

Date	Unit No.	Test No.	Type of Test
3/3/2021	1	--	Set-up
3/4/2021	1 or 2	1-3 HG, 1-3 HCL	Hg, HCL Compliance Tests, Fuel Samples
3/5/2021	1 or 2	1-3 HG, 1-3 HCL	Hg, HCL Compliance Tests, Fuel Samples
3/8/2021	1 or 2	1-3 PM, 1-3 Compliance/ RATA Testing	Particulate Tests 1-3, CEMS RATA and Compliance NO_x, SO_2, CO &VOC Tests 1-3 Fuel Samples
3/9/2021	1 or 2	RATA Testing Continued	CEMS RATA
3/10/2021	1 or 2	1-3 PM, 1-3 Comp. RATA Testing	Particulate Tests 1-3, CEMS RATA and Compliance NO_x, SO_2, CO &VOC Tests 1-3 Fuel Samples
3/11/2021	1 or 2	RATA Testing Continued	CEMS RATA

4.0 REPORTING

MAQS will prepare a comprehensive emissions report that includes all raw data and calculations for the test program. The test format is presented in Table 4-1. The test report will be submitted within 45 days from completion of testing.

TABLE 4-1
REPORT FORMAT

Title page
Report Title
Prepared For
For Submittal To:
Author and reviewer names
Test Dates and Report Issue Date
Report Number

Review Page
Signatures of person who prepared the report and signature of person who reviewed the report

Table of Contents

Introduction and Summary
Identifies the client, source, reason for the test, test date(s), test personnel, client/source personnel, regulatory observers
Summarizes the results of the test, indicates applicable rules and pass/fail criteria and makes a statement regarding the test results
Outlines the organization of remainder of the report.
Table of analysis results

Unit Description
Describes the process which was tested
Describes any applicable control equipment
Test conditions

Test Description
Test methods, replicates, duration, calculations
Test locations
Test critique

Results
Re-states the results of the test and makes a statement regarding compliance with applicable regulations
Results tables with more detail on individual test runs and supporting data

Appendices
A. Test and Laboratory Data
   1. Test Location
   2. Test Data (by type)
   3. Quality Assurance Data
      a. Certification
      b. Equipment Calibration
      c. Calibration Gas Certificate
      d. Chain of Custody
B. Process Operating Data
C. Measurement Procedures
D. Calculations
E. Instrument Strip Charts

APPENDIX A
QUALITY ASSURANCE AND CERTIFICATIONS

QUALITY ASSURANCE PROGRAM SUMMARY

As part of Montrose Air Quality Services, LLC (MAQS) ASTM D7036-04 certification, MAQS is committed to providing emission related data which is complete, precise, accurate, representative, and comparable. MAQS quality assurance program and procedures are designed to ensure that the data meet or exceed the requirements of each test method for each of these items. The quality assurance program consists of the following items:

- Assignment of an Internal QA Officer
- Development and use of an internal QA Manual
- Personnel training
- Equipment maintenance and calibration
- Knowledge of current test methods
- Chain-of-custody
- QA reviews of test programs

Assignment of an Internal QA Officer: MAQS has assigned an internal QA Officer who is responsible for administering all aspects of the QA program.

Internal Quality Assurance Manual: MAQS has prepared a QA Manual according to the requirements of ASTM D7036-04 and guidelines issued by EPA. The manual documents and formalizes all of MAQS QA efforts. The manual is revised upon periodic review and as MAQS adds capabilities. The QA manual provides details on the items provided in this summary.

Personnel Testing and Training: Personnel testing and training is essential to the production of high quality test results. MAQS training programs include:

- A requirement for all technical personnel to read and understand the test methods performed
- A requirement for all technical personnel to read and understand the MAQS QA manual
- In-house testing and training
- Quality Assurance meetings
- Third party testing where available
- Maintenance of training records.

Equipment Maintenance and Calibration: All laboratory and field equipment used as a part of MAQS emission measurement programs is maintained according to manufacturer's recommendations. A summary of the major equipment maintenance schedules is summarized in Table 1. In addition to routine maintenance, calibrations are performed on all sampling equipment according to the procedures outlined in the applicable test method. The calibration intervals and techniques for major equipment components is summarized in Table 2. The calibration technique may vary to meet regulatory agency requirements.

Knowledge of Current Test Methods: MAQS maintains current copies of EPA, ARB, and SCAQMD Source Test Manuals and Rules and Regulations.

Chain-of-Custody: MAQS maintains chain-of-custody documentation on all data sheets and samples. Samples are stored in a locked area accessible only to MAQS source test personnel. Data sheets are kept in the custody of the originator, program manager, or in locked storage until return to MAQS office. Electronic field data is duplicated for backup on secure storage media. The original data sheets are used for report preparation and any additions are initialed and dated.

QA Reviews: Periodic field, laboratory, and report reviews are performed by the in-house QA coordinator. Periodically, test plans are reviewed to ensure proper test methods are selected and reports are reviewed to ensure that the methods were followed and any deviations from the methods are justified and documented.

ASTM D7036-04 Required Information

Uncertainty Statement

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is presented in Section 4.0.

Performance Data

Performance data are available for review.

Qualified Personnel

A qualified individual (QI), defined by performance on a third party or internal test on the test methods, will be present on each test event.

Plant Entry and Safety Requirements

Plant Entry

All test personnel are required to check in with the guard at the entrance gate or other designated area. Specific details are provided by the facility and project manager.

Safety Requirements

All personnel shall have the following personal protective equipment (PPE) and wear them where designated:

- Hard Hat
- Safety Glasses
- Steel Toe Boots
- Hearing Protection
- Gloves
- High Temperature Gloves (if required)

The following safety measures will be followed:

- Good housekeeping
- SDS for all on-site hazardous materials
- Confine selves to necessary areas (stack platform, mobile laboratory, CEMS data acquisition system, control room, administrative areas)
- Knowledge of evacuation procedures

Each facility will provide plant specific safety training.

TABLE 1
EQUIPMENT MAINTENANCE SCHEDULE

Equipment	Acceptance Limits	Frequency of Service	Methods of Service
Pumps	1. Absence of leaks 2. Ability to draw manufacturers required vacuum and flow	As recommended by manufacturer	1. Visual inspection 2. Clean 3. Replace parts 4. Leak check
Flow Meters	1. Free mechanical movement	As recommended by manufacturer	1. Visual inspection 2. Clean 3. Calibrate
Sampling Instruments	1. Absence of malfunction 2. Proper response to zero span gas	As recommended by manufacturer	As recommended by manufacturer
Integrated Sampling Tanks	1. Absence of leaks	Depends on nature of use	1. Steam clean 2. Leak check
Mobile Van Sampling System	1. Absence of leaks	Depends on nature of use	1. Change filters 2. Change gas dryer 3. Leak check 4. Check for system contamination
Sampling lines	1. Sample degradation less than 2%	After each test series	1. Blow dry, inert gas through line until dry

TABLE 2
MAJOR SAMPLING EQUIPMENT CALIBRATION REQUIREMENTS

Sampling Equipment	Calibration Frequency	Calibration Procedure	Acceptable Calibration Criteria
Continuous Analyzers	Before and After Each Test Day	3-point calibration error test	< 2% of analyzer range
Continuous Analyzers	Before and After Each Test Run	2-point sample system bias check	< 5% of analyzer range
Continuous Analyzers	After Each Test Run	2-point analyzer drift determination	< 3% of analyzer range
CEMS System	Beginning of Each Day	leak check	< 1 in. Hg decrease in 5 min. at > 20 in. Hg
Continuous Analyzers	Semi-Annually	3-point linearity	< 1% of analyzer range
NO_x Analyzer	Daily	NO_2 -> NO converter efficiency	> 90%
Differential Pressure Gauges (except for manometers)	Semi-Annually	Correction factor based on 5-point comparison to standard	+/- 5%
Differential Pressure Gauges (except for manometers)	Bi-Monthly	3-point comparison to standard, no correction factor	+/- 5%
Barometer	Semi-Annually	Adjusted to mercury-in-glass or National Weather Service Station	+/- 0.1 inches Hg
Dry Gas Meter	Semi-Annually	Calibration check at 4 flow rates using a NIST traceable standard	+/- 2%
Dry Gas Meter	Bi-Monthly	Calibration check at 2 flow rates using a NIST traceable standard	+/- 2% of semi-annual factor
Dry Gas Meter Orifice	Annually	4-point calibration for $\Delta H@$	--
Temperature Sensors	Semi-Annually	3-point calibration vs. NIST traceable standard	+/- 1.5%

Note: Calibration requirements will be used that meet applicable regulatory agency requirements.

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

September 9, 2020

Mr. John Peterson
Montrose Air Quality Services, LLC
1631 E. Saint Andrew Place
Santa Ana, CA 92705

Subject: LAP Approval Notice
Reference # 96LA1220

Dear Mr. Peterson:

We have reviewed your renewal letter under the South Coast Air Quality Management District's Laboratory Approval Program (LAP). We are pleased to inform you that your firm is approved for the period beginning September 30, 2020, and ending September 30, 2021 for the following methods, subject to the requirements in the LAP Conditions For Approval Agreement and conditions listed in the attachment to this letter:

Methods 1-4	Methods 5.1, 5.2, 5.3, 6.1
Methods 10.1 and 100.1	Methods 25.1 and 25.3 (Sampling)
USEPA CTM-030 and ASTM D6522-00	Rule 1121/ 1146.2 Protocol

Rule 1420/1420.1/1420.2 – (Lead) Source and Ambient Sampling

Your LAP approval to perform nitrogen oxide emissions compliance testing for Rule 1121/ 1146.2 Protocols includes satellite facilities located at:

McKenna Boiler 1510 North Spring Street Los Angeles, CA 90012	Noritz America Corp. 11160 Grace Avenue Fountain Valley, CA 92708	Ajax Boiler, Inc. 2701 S. Harbor Blvd. Santa Ana, CA 92704

Laundry Building of VA Greater Los Angeles Healthcare System
508 Constitution Avenue
Los Angeles, CA 90049

Thank you for participating in the LAP. Your cooperation helps us to achieve the goal of the LAP: to maintain high standards of quality in the sampling and analysis of source emissions. You may direct any questions or information to LAP Coordinator, Glenn Kasai. He may be reached by telephone at (909) 396-2271, or via e-mail at gkasai@aqmd.gov.

Sincerely,

D. Sarkar

Dipankar Sarkar
Program Supervisor
Source Test Engineering

DS:GK/gk
Attachment

200909 LapRenewalRev.doc

State of California

California Air Resources Board

Approved Independent Contractor

Montrose Air Quality Services, LLC

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2022, for those test methods listed below:

CARB Source Test Methods:
1, 2, 3, 3.1, 5, 6, 8, 17, 20
100 (CO, CO_2, NO_x, O_2, SO_2, THC)

Catherine Dunwoody, Chief
Monitoring and Laboratory Division

State of California

California Air Resources Board

Approved Independent Contractor

Montrose Air Quality Services, LLC

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2022, for those test methods listed below:

U.S. EPA Source Test Methods 2, 2A, 2C and 2D
Visible Emissions Evaluation

Catherine Dunwoody, Chief
Monitoring and Laboratory Division

STAC STACK TESTING ACCREDITATION COUNCIL

A2LA American Association for Laboratory Accreditation

Accredited Air Emission Testing Body

A2LA has accredited

MONTROSE AIR QUALITY SERVICES

In recognition of the successful completion of the joint A2LA and Stack Testing Accreditation Council (STAC) evaluation process, this laboratory is accredited to perform testing activities in compliance with ASTM D7036:2004 - Standard Practice for Competence of Air Emission Testing Bodies.

Presented this 11th day of February 2020.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3925.01
Valid to February 28, 2022

This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.

MONTROSE AIR QUALITY SERVICES

APPENDIX B
SAMPLE LOCATION VERIFICATION DATA

STACK GAS STRATIFICATION AND ABSENCE OF FLOW DISTURBANCE TESTING AT COLMAC MECCA PROJECT

Prepared For:

UC Operating Service
Mecca, California

For Submittal To:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
Diamond Bar, California

Prepared By:

Edward J. Filadelfia

CARNOT
Tustin, California

JULY 1994

REVIEW AND CERTIFICATION

All work, calculations, and other activities and tasks performed and documented in this report were carried out under my direction and supervision.

Edward J. Filadelfia
Senior Engineer

Date 10/14/94

I have reviewed, technically and editorially, details, calculations, results, conclusions and other appropriate written material contained herein, and hereby certify that the presented material is authentic and accurate.

Edward J. Filadelfia
Senior Engineer

Date 10/14/94

TABLE OF CONTENTS

SECTION 1.0

INTRODUCTION

Carnot was contracted by UC Operating Service (UCOS) to determine the suitability of the alternate sample location accessible from the stack inlet duct. Tests were conducted to determine the level of stack gas stratification and flow disturbance. The tests were performed at this location to satisfy the requirements of alternate sample location CFR 40 Appendix A Method 1. The tests were performed using the standard methods in Chapter X of the SCAQMD's Source Test Manual.

The flow disturbance and gaseous stratification tests were performed on June 27-28, 1994. The test program was coordinated by Greg Deedon of UCOS and Edward Filadelfia of Carnot. The Carnot test team consisted of Edward Filadelfia, Dave Wonderly, and Chris Hone. Unit operation was established and maintained by UCOS personnel.

The results of the tests are summarized in Tables 1-1 and 1-2. These results show that the sample location meets the requirements of the SCAQMD and EPA by demonstrating that the stack gas stratification is less than 10% and the average resultant flow angle is less than 20 degrees with a standard deviation of less than 10 degrees.

A description of the unit is presented in Section 2.0. Test procedures and locations are presented in Section 3.0. Test results are presented in Section 4.0. Tests procedure descriptions, field data sheets, calculations, and control room data are included in the Appendices.

TABLE 1-1
SUMMARY OF GASEOUS STRATIFICATION
COLMAC ENERGY PROJECT
JULY 1994

Parameter	Unit 1 % Stratification	Unit 2 % Stratification	SCAQMD Limit, %
O_2, %	0.4%	1.0%	≤10

TABLE 1-2
SUMMARY OF FLOW DISTURBANCE MEASUREMENTS
COLMAC ENERGY PROJECT
JULY 1994

Parameter	Unit 1 Measured	Unit 2 Measured	SCAQMD Limit, %	EPA Limit, %
Average Resultant Angle, Degrees	5.6°	5.9°	≤20	≤20
Standard Deviation, Degrees	3.3°	4.0°	≤10	N/A

SECTION 2.0

UNIT DESCRIPTION

The Colmac Energy Plant consists of two 297 MMBtu/hour, circulating bed boilers, the combined units are designed to produce 47 MW of net electrical output. Each unit is equipped with the following pollution control systems:

1. An ammonia injection system for control of NO_x emissions.

2. Cyclonic mixing of injected ammonia with flue gas to provide for a minimum amount of ammonia slip (emission).

3. A limestone injection system to limit emissions of SO_2.

4. A reverse air baghouse to restrict opacity and emissions of sulfates and particulate to very low levels.

SECTION 3.0

TEST DESCRIPTION

3.1 TEST CONDITIONS

All tests were performed with the unit operating at full load. Tests were conducted while the unit was firing bio mass and operating under normal conditions. Unit operations were established by UCOS operators.

3.2 SAMPLE LOCATION

Measurements were made from Units 1 and 2 inlet ducts to the stack. A schematic of the Sample location is shown in Figure 3-1. Chapter X sampling consisted of 40 point traverse for stratification, and a 42 point traverse for flow disturbances.

3.3 TEST PROCEDURES

Tests were performed using methods from the SCAQMD's Source Test Manual. These methods are contained in Chapter X - Section 1 for disturbed flow and Section 13 for gaseous stratification. Table 3-1 presents the test methods used in this program. O_2 concentrations were measured using Carnot's mobile emission monitoring system. Flow angles were measured using a United Sensor 3D probe. A description of the Carnot's Continuous Emissions Monitoring System and the standard measurement procedures are presented in Appendix A. A summary of the procedures used for gaseous stratification and disturbed flow are presented below.

3.3.1 Gaseous Stratification

Chapter X (Non-Standard Methods and Techniques), Chapter 13 of the SCAQMD Source Test Manual defines gaseous stratification as the presence of a difference, in excess of 10 percent, between any two points in the same cross sectional plane. Stratification can be determined for either pollutant gases (e.g., NO_x) or diluent gases (e.g., O_2, CO_2) in units of concentration. For this test program, the O_2 concentration was used to measure the level of stack gas stratification.

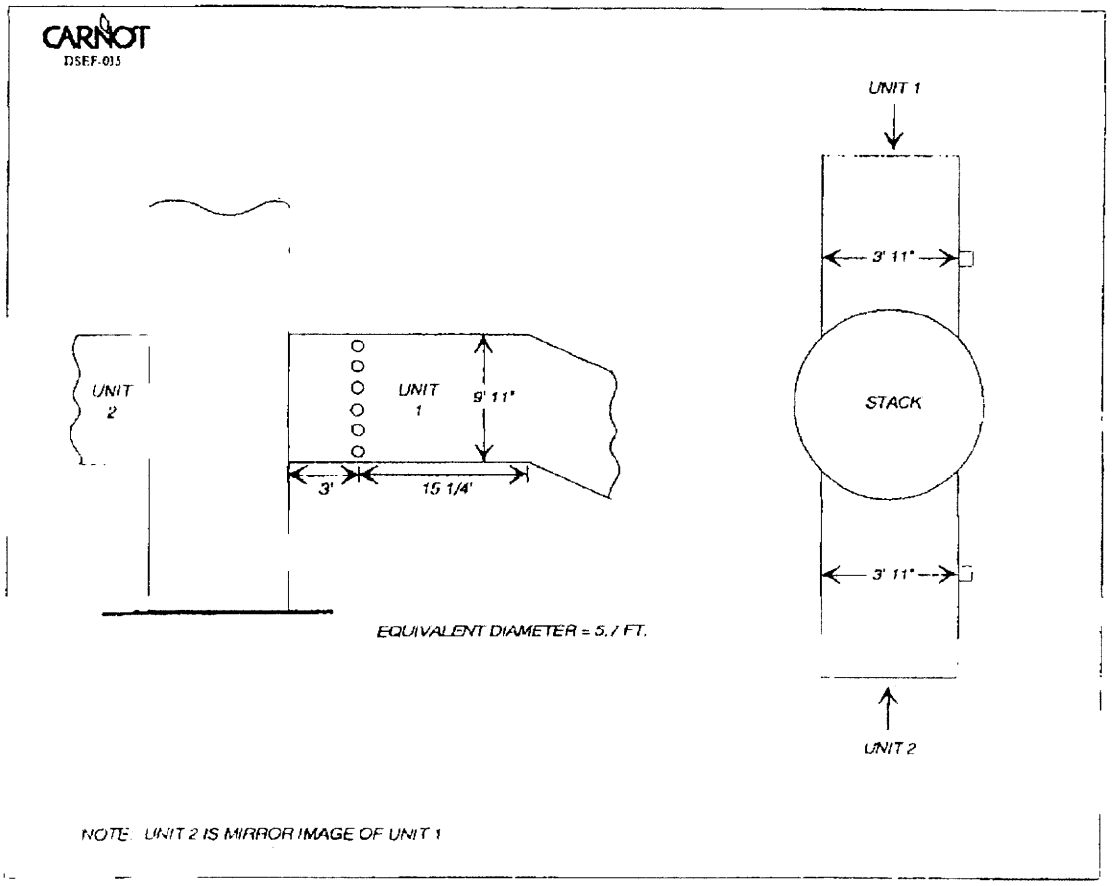


Figure 3-1. UCOS - Duct Sample Locations

Due to variations in process O_2 concentrations, two O_2 analyzers were used. The first O_2 analyzer was used as a reference point and located at the center of the duct. The second was located at 40 traverse points during the test. Gases were monitored for three minutes at each traverse point.

TABLE 3-1
TEST PROCEDURES
COLMAC ENERGY PROJECT
JULY 1994

Parameter	Units	Measurement Principle	Reference Method	Comments
O_2	%	Electrochemical Cell	EPA 3A	40 point traverse for gaseous stratification according to Chapter X, Section 13
Flow Angle	Degrees	3D probe for pitch and yaw	1.1	42 point traverse for disturbed flow according to Chapter X, Section 1

SECTION 4.0

RESULTS

4.1 GASEOUS STRATIFICATION

The results of the gaseous stratification tests are summarized in Table 4-1. The results show that the O_2 concentration stratification levels for both sample locations were below the limit of 10%.

TABLE 4-1
GASEOUS STRATIFICATION
COLMAC ENERGY PROJECT
JULY 1994

Parameter	Percent Stratification
Unit 1 O_2, %	0.4 %
Unit 2 O_2, %	1.0 %

4.2 FLOW DISTURBANCE

The results of the flow disturbance measurements made with the 3-dimensional velocity probe are presented in Table 4-2. The results of these tests show that the average resultant flow angle was below the limit of 20 degrees with a standard deviation of less than 10 degrees for both sample locations.

TABLE 4-2
FLOW DISTURBANCE RESULTS
COLMAC ENERGY PROJECT
JULY 1994

Parameter	Unit 1 3D Probe	Unit 2 3D Probe
Avg. Yaw Angle, degrees	2.0	4.4
Avg. Pitch Angle, degrees	-0.4	-1.0
Avg. Resultant Angle, degrees	5.6	5.9
Standard Deviation, degrees	3.3	4.0

APPENDIX A
MEASUREMENT PROCEDURES

Continuous Emissions Monitoring System

Oxygen (O_2) by Continuous Analyzer

Three-Dimensional Velocity Testing

Continuous Emissions Monitoring System

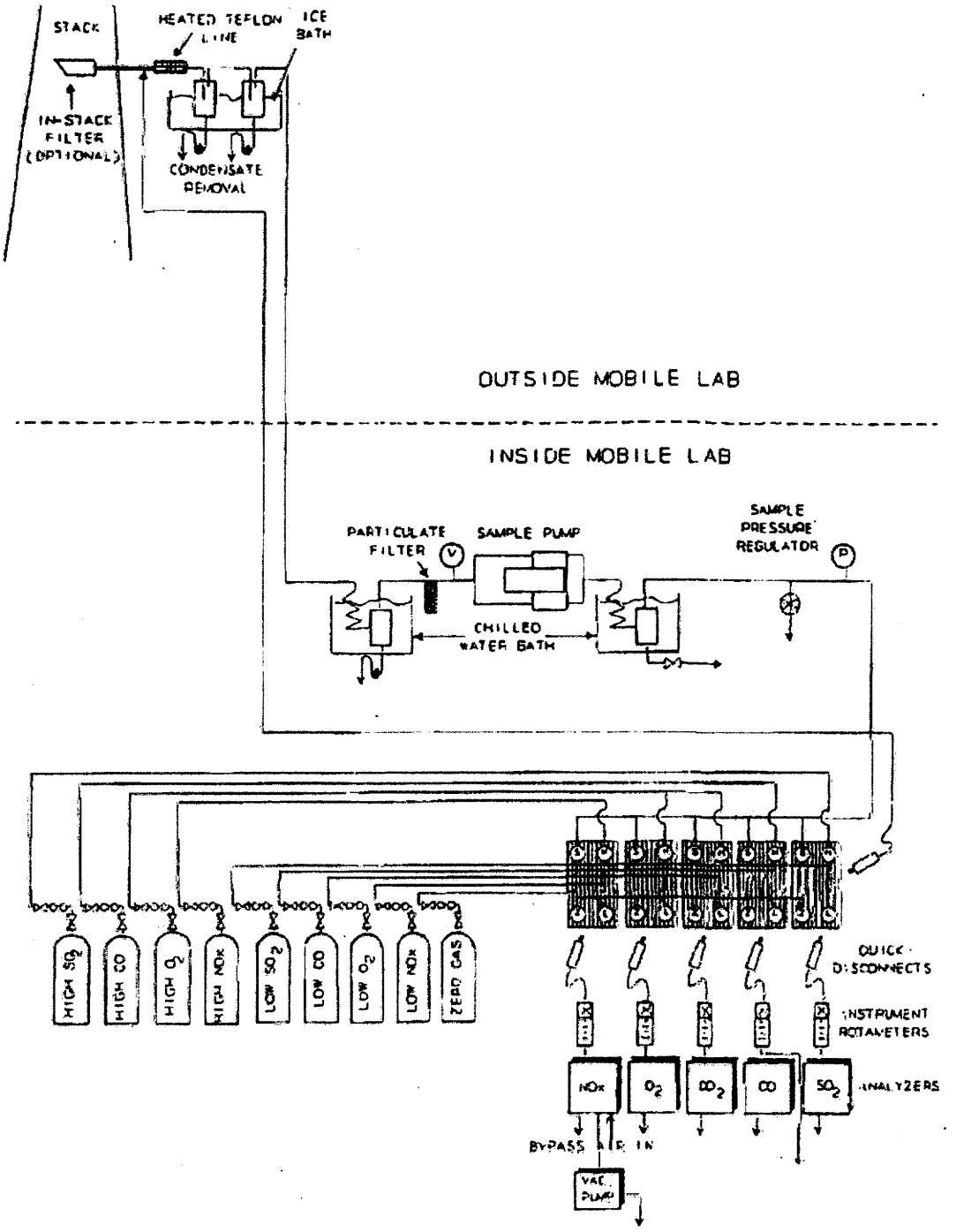
O_2, CO, CO_2, NO, NO_x and SO_2 are measured using an extractive continuous emissions monitoring (CEM) package, shown in the following figure. This package is comprised of three basic subsystems. They are: (1) the sample acquisition and conditioning system, (2) the calibration gas system, and (3) the analyzers themselves. This section presents a description of the sampling and calibration systems. Descriptions of the analyzers used in this program and the corresponding reference test methods follow. Information regarding quality assurance information on the system, including calibration routines and system performance data follows.

The sample acquisition and conditioning system contains components to extract a representative sample from the stack or flue, transport the sample to the analyzers, and remove moisture and particulate material from the sample. In addition to performing the tasks above, the system must preserve the measured species and deliver the sample for analysis intact. The sample acquisition system extracts the sample through a stainless steel probe. The probe is insulated or heated as necessary to avoid condensation. If the particulate loading in the stack is high, a sintered stainless steel filter is used on the end of the probe.

Where water soluble NO_2 and/or SO_2 are to be measured, the sample is drawn from the probe through a heated teflon sample line into an on-stack cooled (approximately 35-40°F) water removal trap. The trap consists of stainless steel flasks in a bath of ice and water. This design removes the water vapor by condensation. The contact between the sample and liquid water is minimized and the soluble NO_2 and SO_2 are conserved. This system meets the requirements of EPA Method 20. The sample is then drawn through a teflon transport line, particulate filter, secondary water removal and into the sample pump. The pump is a dual head, diaphragm pump. All sample-wetted components of the pump are stainless steel or teflon. The pressurized sample leaving the pump flows through a third condensate trap in a refrigerated water bath (≈38°F) for final moisture removal. A drain line and valve are provided to constantly expel any condensed moisture from the dryer at this point. After the dryer, the sample is directed into a distribution manifold. Excess sample is vented through a back-pressure regulator, maintaining a constant pressure of 5-6 psig to the analyzer rotameters.

The calibration system is comprised of two parts: the analyzer calibration, and the system bias check (dynamic calibration). The analyzer calibration equipment includes pressurized cylinders of certified span gas. The gases used are, as a minimum, certified to 1% by the manufacturer. Where necessary to comply with reference method requirements EPA Protocol I gases are used. The cylinders are equipped with pressure regulators which supply the calibration gas to the analyzers at the same pressure and flow rate as the sample. The selection of zero, span, or sample gas directed to each analyzer is accomplished by operation of the sample/calibration selector fittings.

The system bias check is accomplished by transporting the same gases used to zero and span the analyzers to the sample system as close as practical to the probe inlet. This is done either by attaching the calibration gas supply line to the probe top with flexible tubing or by actuation of a solenoid valve located at the sample conditioner inlet (probe exit). The span gas is exposed to the same elements as the sample and the system response is documented. The analyzer indications for the system calibration check must agree within 5% of the analyzer calibration. Values are adjusted and changes/repairs are made to the system to compensate for any difference in analyzer readings. Specific information on the analytical equipment and test methods used is provided in the following pages.



Schematic of CEM System

Method:	**Oxygen (O_2) by Continuous Analyzer**
Applicable Reference Methods:	EPA 3A, EPA 20, ARB 100, BA ST-14, SCAQMD 100.1
Principle:	A sample is continuously drawn from the flue gas stream, conditioned, and conveyed to the instrument for direct readout of O_2 concentration.
Analyzer:	Teledyne Model 326A
Measurement Principle:	Electrochemical cell
Ranges:	0-5, 0-10, 0-25 % O_2
Accuracy:	1 % of full scale
Output:	0-100 mV, linear
Interferences:	Halogens and halogenated compounds will cause a positive interference. Acid gases will consume the fuel cell and cause a slow calibration drift.
Response Time:	90% <7 seconds
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. If Method 20 is used, that method's specific procedures for selecting sample points are used. Otherwise, stratification checks are performed at the start of a test program to select single or multiple-point sample locations.
Analytical Procedure:	An electrochemical cell is used to measure O_2 concentration. Oxygen in the flue gas diffuses through a Teflon membrane and is reduced on the surface of the cathode. A corresponding oxidation occurs at the anode internally, and an electric current is produced that is proportional to the concentration of oxygen. This current is measured and conditioned by the instrument's electronic circuitry to give an output in percent O_2 by volume.
Special Calibration Procedure:	The measurement cells used with the O_2 instrument have to be replaced on a regular basis. After extended use, the cell tend to produce a nonlinear response. Therefore, a three-point calibration is performed at the start of each test day to check for linearity. If the response is not linear ($\pm$ 2% of scale), the cell is replaced.

Method:	Three-Dimensional Velocity Testing
Applicable Ref. Method:	EPA Method 1, ANSI ASME PTC 11 - 1984
Applicability of Method:	When a sample location to be used for velocity or particulate tests does not meet the traditional Method 1 criteria of being at least two duct diameters downstream and one-half diameter upstream of any flow disturbance, this alternate method is used to evaluate the suitability of the location. A three-dimensional velocity probe is used to measure pitch and yaw angle at a minimum of 40 traverse points for round ducts and 42 points for rectangular ducts. If the average resultant angle is less than 20° and the standard deviation is less than 10°, the sample location is deemed acceptable. Velocity and particulate traverses are then performed at the same traverse points using standard Method 2 and 5 equipment and procedures.
Principle:	The instrument measures yaw and pitch angles of fluid flow, as well as total and static pressures.
Analyzer:	United Sensor Three-Dimensional Directional Probe
Sampling Procedure:	Each probe has five measuring holes in its tip. A centrally located pressure hole measures pressure P1, while two lateral pressure holes measure pressures P2 and P3. If the probe is rotated manually until P2 and P3 are identical as a readout on the manometer, the yaw angle of flow is then indicated by the number of degrees rotated. When the yaw angle has been determined, an additional differential pressure P4 - P5 is measured by pressure holes located above and below the total pressure (P1) hole. Pitch angle is determined by calculating (P4 - P5)/(P1 - P2) and using the calibration data for the individual probe and interpolating between the bracketing data. At any particular pitch angle, the velocity pressure coefficient (Pt - Ps)/(P1 -P2) can also be interpolated from the calibration data and Pt - Ps and Ps calculated. Note that this probe also allows for very accurate gas flow measurements, in addition to the EPA Method 1 procedures that allow it to be used for determination of flow angle.

Definitions:

P_1 = Total Pressure
P_2 = Static Pressure
P_3 = Static Pressure
P_4 = Pitch Pressure
P_5 = Pitch Pressure

$P_1 - P_2$ = Velocity Head Pressure

$\frac{P_4 - P_5}{P_1 - P_2}$ = Pitch angle calculated on calibration curve

Calculations:

Velocity (fps) in direction of flow

$$V_s = 2.90\ C_P \sqrt{\Delta P\ T_s}\ \sqrt{\left(\frac{29.92}{P_S}\right)\left(\frac{28.95}{MW_{wet}}\right)}$$

where:
C_P = Pitot Calibration factor
ΔP = Average velocity, head, iwg $(\overline{\sqrt{\Delta P}})^2$
T_s = Stack Temperature, °R
P_s = Stack Pressure (iwg)
MW_{wet} = Molecular weight, wet

Resultant angle:

$$R = \left| \frac{\cos^{-1}(\cos\phi_{Y,R}\ \cos\phi_{P,R})}{0.0175} \right|$$

where:
$\phi_{Y,R}$ = Yaw Angle in Radians
$\phi_{P,R}$ = Pitch Angle in Radians
R = Resultant Angle in Degrees

Pitch Angle Curve Fit Equation (Degrees)

$$\phi_P = A_1\left(\frac{P_4-P_5}{P_1-P_2}\right) + A_2\left(\frac{P_4-P_5}{P_1-P_2}\right)^2 - A_3\left(\frac{P_4-P_5}{P_1-P_2}\right)^3 - A_4\left(\frac{P_4-P_5}{P_1-P_2}\right)^4 + A_5\left(\frac{P_4-P_3}{P_1-P_2}\right)^5 + A_6\left(\frac{P_4-P_5}{P_1-P_2}\right)^6$$

Pitot coefficient curve fit equation (used to calculate corrected axial velocities)

$$\frac{P_1-P_s}{P_1-P_2} = B_1 + B_2\,\phi_P + B_3 + \phi_P - B_4\,\phi_P^3 + B_5\,\phi_P^4 + B_6\ \phi_P^5 + B_7\,\phi_P^6$$

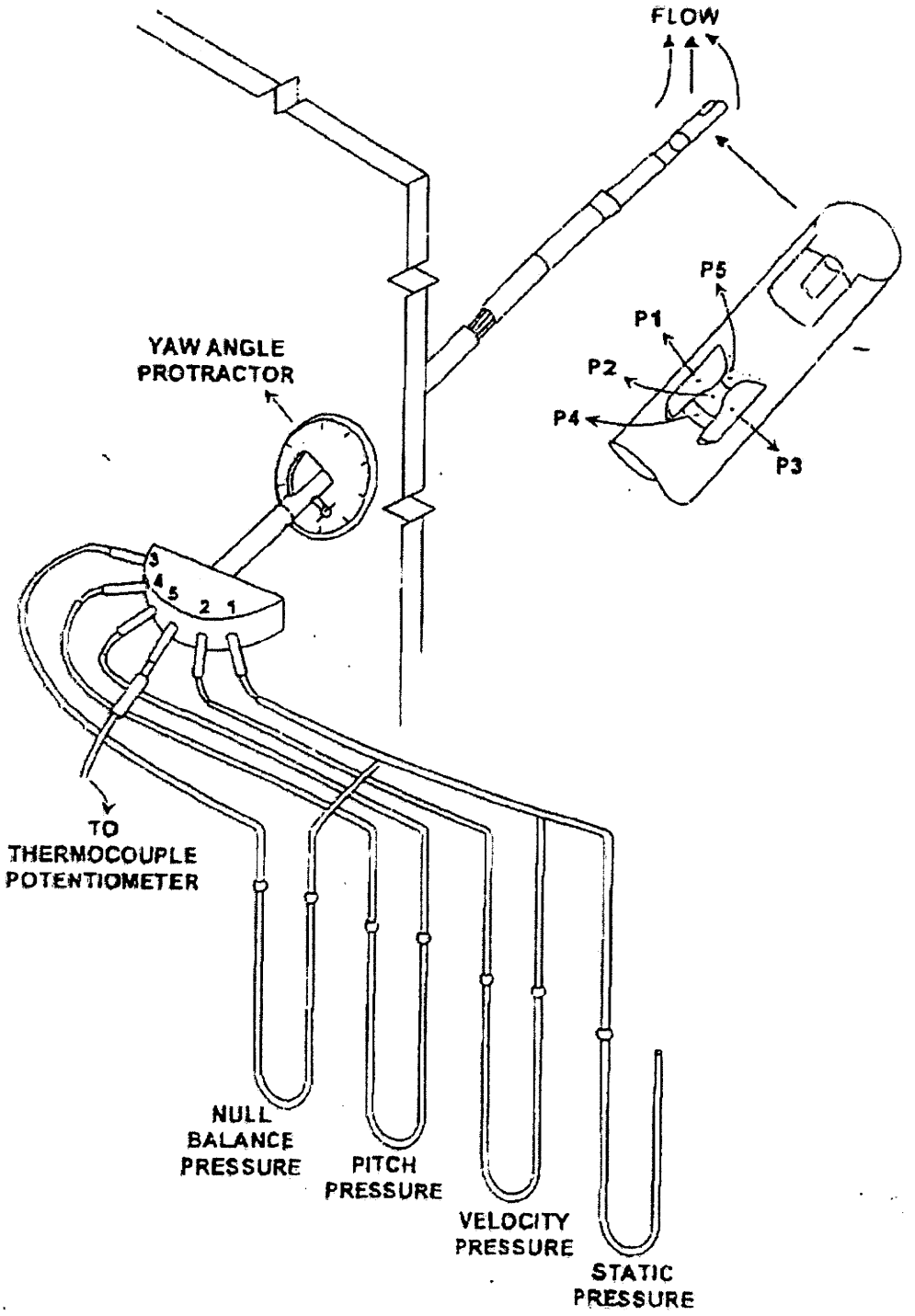


Figure Five Hole Probe

3-DIMENSIONAL VELOCITY PROBE CALIBRATION FACTORS

Probe	B-2455
A_1	63.09
A_2	23.69
A_3	24.505
A_4	33.312
A_5	7.5203
A_6	11.669
B_1	0.997
B_2	7×10^{-3}
B_3	3×10^{-5}
B_4	8×10^{-7}
B_5	1×10^{-9}
B_6	3×10^{-10}
B_7	3×10^{-2}

APPENDIX B
QUALITY ASSURANCE

Appendix B.1

Quality Assurance Program Summary

QUALITY ASSURANCE PROGRAM SUMMARY AND ARB CERTIFICATION

Carnot ensures the quality and validity of its emission measurement and reporting procedures through a rigorous quality assurance (QA) program. The program is developed and administered by an internal QA Officer and encompasses seven major areas:

1. Development and use of an internal QA manual.
2. QA reviews of reports, laboratory work, and field testing.
3. Equipment calibration and maintenance.
4. Chain of custody.
5. Training.
6. Knowledge of current test methods.
7. Agency certification.

Each of these areas is discussed individually below.

Quality Assurance Manual. Carnot has prepared a QA Manual according to EPA guidelines. The manual serves to document and formalize all of Carnot's QA efforts. The manual is constantly updated, and each member of the Source Test Division is required to read and understand its contents. The manual includes details on the other six QA areas discussed below.

QA Reviews. Carnot's review procedure includes review of each source test report by the QA Officer, and spot check reviews of laboratory and field work.

The most important review is the one that takes place before a test program begins. The QA Officer works closely with Source Test Division personnel to prepare and review test protocols. Test protocol review includes selection of appropriate test procedures, evaluation of any interferences or other restrictions that might preclude use of standard test procedures, and evaluation and/or development of alternate procedures.

Equipment Calibration and Maintenance. The equipment used to conduct the emissions measurements is maintained according to the manufacturer's instructions to ensure proper operation. In addition to the maintenance program, calibrations are carried out on each measurement device according to the schedule outlined by the California Air Resources Board (CARB). The schedule for maintenance and calibrations are given in Tables B-1 and B-2. Quality control checks are also conducted in the field for each test program. The following is a partial list of checks made as part of each CEM system test series.

- Sample acquisition and conditioning system leak check.
- 2-point analyzer calibrations (all analyzers)
- 3-point analyzer calibrations (analyzers with potential for linearity errors).
- Complete system calibration check ("dynamic calibration" through entire sample system).

- Periodic analyzer calibration checks (once per hour) are conducted at the start and end of each test run. Any change between pre- and post-test readings are recorded.

- All calibrations are conducted using gases certified by the manufacturer to be + 1% of label value (NBS traceable).

Calibration and CEM performance data are fully documented, and are included in each source test report.

Chain of Custody. Carnot maintains full chain of custody documentation on all samples and data sheets. In addition to normal documentation of changes between field sample custodians, laboratory personnel, and field test personnel, Carnot documents every individual who handles any test component in the field (e.g., probe wash, impinger loading and recovery, filter loading and recovery, etc.).

Samples are stored in a locked area to which only Source Test Division personnel have access. Neither other Carnot employees nor cleaning crews have keys to this area.

Data sheets are copied immediately upon return from the field, and this first generation copy is placed in locked storage. Any notes made on original sheets are initialed and dated.

Training. Personnel training is essential to ensure quality testing. Carnot has formal and informal training programs which include:

1. Attendance at EPA-sponsored training courses.
2. Enrollment in EPA correspondence courses.
3. A requirement for all technicians to read and understand Carnot's QA Manual.
4. In-house training and QA meetings on a regular basis.
5. Maintenance of training records.

Knowledge of Current Test Methods. With the constant updating of standard test methods and the wide variety of emerging test methods, it is essential that any qualified source tester keep abreast of new developments. Carnot subscribes to services which provide updates on EPA and CARB reference methods, and on EPA, CARB and SCAQMD rules and regulations. Additionally, source test personnel regularly attend and present papers at testing and emission-related seminars and conferences. Carnot personnel maintain membership in the Air and Waste Management Association, the Source Evaluation Society, and the ASME Environmental Control Division.

AGENCY CERTIFICATION

Carnot is certified by the CARB as an independent source test contractor for gaseous and particulate measurements. Carnot is certified by the SCAQMD as an independent source test contractor for gaseous and particulate measurements using SCAQMD Methods 1, 2, 3, 4, 5, 6, 7 and 100.1. Carnot also participates in EPA QA audit programs for Methods 5, 6 and 7.

TABLE B-1
SAMPLING INSTRUMENTS AND EQUIPMENT CALIBRATION SCHEDULE
As Specified by the CARB

Instrument Type	Frequency of Calibration	Standard of Comparison or Method of Calibration	Acceptance Limits
Orifice Meter (large)	12 months	Calibrated dry test meter	± 2% of volume measured
Dry Gas Meter	12 months or when repaired	Calibrated dry test meter	± 2% of volume measured
S-Type Pitot (for use with EPA-type sampling train	6 months	EPA Method 2	Cp constant (+5%) over working range; difference between average Cp for each leg must be less than 2%
Vacuum Gauges Pressure Gauges	6 months	Manometer	± 3%
Field Barometer	6 months	Mercury barometer	± 0.2" Hg
Temperature Measurement	6 months	NBS mercury thermometer or NBS calibrated platinum RTD	± 4°F for <400°F ± 1.5% for >400°F
Temperature Readout Devices	6 months	Precision potentiometer	± 2% full scale reading
Analytical Balance	12 months (check prior to each use)	Should be performed by manufacturer or qualified laboratory	± 0.3 mg of stated weight
Probe Nozzles	12 Months	Nozzle diameter check micrometer	Range < ± 0.10 mm for three measurements
Continuous Analyzers	Depends upon use, frequency and performance	As specified by manufacturers operating manuals, EPA NBS gases and/or reference methods	Satisfy all limits specified in operating specifications

TABLE B-2
EQUIPMENT MAINTENANCE SCHEDULE
Based on Manufacturer's Specifications and Carnot Experience

Equipment	Performance Requirement	Maintenance Interval	Corrective Action
Pumps	1. Absence of leaks 2. Ability to draw manufacturer required vacuum and flow	Every 500 hours of operation or 6 months, whichever is less	1. Visual inspection 2. Clean 3. Replace worn parts 4. Leak check
Flow Measuring Device	1. Free mechanical movement 2. Absence of malfunction	Every 500 hours of operation or 6 months, whichever is less After each test, if used in H_2S sampling or other corrosive atmospheres	1. Visual inspection 2. Clean 3. Calibrate
Sampling Instruments	1. Absence of malfunction 2. Proper response to zero, span gas	As required by the manufacturer	As recommended by manufacturer
Integrated Sampling Tanks	Absence of leaks	Depends on nature of use	1. Steam clean 2. Leak check
Mobile Van Sampling Systems	Absence of leaks	Depends on nature of use	1. Change filters 2. Change gas dryer 3. Leak check 4. Check for system contamination
Sampling Lines	Sample degradation less than 2%	After each test or test series	Blow filtered air through line until dry

Appendix B.2

ARB Certification

State of California
AIR RESOURCES BOARD

Executive Order G-94-028

Approval to Carnot
To Conduct Testing as an Independent Contractor

WHEREAS, the Air Resources Board (ARB), pursuant to Section 41512 of the California Health and Safety Code, has established the procedures contained in Section 91200-91220, Title 17, California Code of Regulations, to allow the use of independent testers for compliance tests required by the ARB; and

WHEREAS, pursuant to Sections 91200-91220, Title 17, California Code of Regulations, the Executive Officer has determined that Carnot meets the requirements of the ARB for conducting ARB Test Methods 1, 2, 3, 4, 5, 6, 8, 10, and 100 (NOx, O2) when the following conditions are met:

1. Carnot conducts ARB Test Method 100 for O2 using a Teledyne 326 analyzer with either a A5 or a B1 sensor, or a paramagnetic analyzer.

NOW, THEREFORE, BE IT ORDERED that Carnot is granted an approval, from the date of execution of this order, until June 30, 1995 to conduct the tests listed above, subject to compliance with Section 91200-91220, Title 17, California Code of Regulations.

BE IT FURTHER ORDERED that during the approved period the Executive Officer or his or her authorized representative may field audit one or more tests conducted pursuant to this order for each type of testing listed above.

Executed this 29TH day of JUNE 1994, at Sacramento, California.

James J. Morgester, Chief
Compliance Division

STATE OF CALIFORNIA
AIR RESOURCES BOARD
2020 L STREET
P.O. BOX 2815
SACRAMENTO, CA 95812

PETE WILSON, Governor

July 8, 1994

Mr. Michael L. Schmitt
Carnot
15991 Red Hill Avenue, Suite 110
Tustin, California 92680

Dear Mr. Schmitt:

Testing Approval

We are pleased to inform you that we have renewed your approval to conduct the types of testing listed in the enclosed Executive Order. This approval is valid until June 30, 1995 during which time a field audit of your company's testing ability may be conducted. We have also enclosed a certificate of approval.

Should you have any questions or need further assistance, please contact Ms. Kathryn Gugeler at (916) 327-1521 or Mr. David Tribble at (916) 323-2217. All correspondence should be addressed to me at the post office box above.

Sincerely,

James J. Morgester, Chief
Compliance Division

Enclosures

cc: Mr. Ed Jeung
Department of Health Services
Air and Industrial Hygiene Laboratory
2151 Berkeley Way
Berkeley, California 94704

State of California

Air Resources Board

Approved Independent Contractor

Carnot

This is to certify that the company listed above has been approved by the Air Resources Board to conduct compliance testing pursuant to Section 91207, Title 17, California Code of Regulations, until June 30, 1995, for those test methods listed below:

ARB Source Test Methods:
1, 2, 3, 4, 5, 6, 8, 10, 100(NOx, O2)

James J. Morgester, Chief
Compliance Division

Laura McKinney, Manager
Certification and Investigation Section

Appendix B.3

Calibration Data

CARNOT
SPAN GAS RECORD

CLIENT/LOCATION: U605 - Colmac DATE: 6/27/18

BY: CS

GAS	SPAN CYLINDER		AUX. SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO		99.999 %		
NOx	AAL3583	88.54	AAL1240 J	47.51
O_2	ALM045927	6.937	ALM05739	12.45
CO				
CO_2	ALM 045927	22.43	ALM05739	15.16
SO_2				

CARNOT
INSTRUMENT LINEARITY

	ANALYZER				
	O_2	CO_2	CO	NOx	SO_2
ANALYZER RANGE	0-25	-	—	0-100	—
SET TO HIGH STD (80-90% OF RANGE)	20.9	—	—	88.5	—
ACTUAL VALUE OF LOW STD	12.45	—	—	47.51	—
AS-FOUND LOW STD (50-60% OF RANGE)	12.33	—	—	48.9	—
DIFFERENCE IN % OF FULL SCALE	0.5	—	—	+1.3	—

% ERROR CALCULATION:

$$\frac{(\text{AS FOUND} - \text{ACTUAL VALUE OF SPAN})}{\text{RANGE}} \times 100$$

ALLOWABLE DEVIATION IS 2% OF FULL SCALE (2 SQUARES ON STRIP CHART).

CARNOT

PMF-009

CARNOT
SPAN GAS RECORD

CLIENT/LOCATION: UCOS Colmac DATE: 6-28-94

BY: D.U.

GAS	SPAN CYLINDER		AUX. SPAN CYLINDER	
	CYLINDER NO.	CONCENTRATION	CYLINDER NO.	CONCENTRATION
ZERO				
NOx	AAL3583	88.54	AAL12400	47.51
O_2	ALM-045927	8.937	ALM-739	12.45
CO				
CO_2				
SO_2				

CARNOT
INSTRUMENT LINEARITY

	ANALYZER				
	O_2	CO_2	CO	NOx	SO_2
ANALYZER RANGE	0-25			0-100	
SET TO HIGH STD (80-90% OF RANGE)	20.74			88.5	
ACTUAL VALUE OF LOW STD	12.45			47.51	
AS-FOUND LOW STD (50-60% OF RANGE)	12.55			47.00	
DIFFERENCE IN % OF FULL SCALE	.5%			.5%	

% ERROR CALCULATION:

$$\frac{(\text{AS FOUND} - \text{ACTUAL VALUE OF SPAN})}{\text{RANGE}} \times 100$$

ALLOWABLE DEVIATION IS 2% OF FULL SCALE (2 SQUARES ON STRIP CHART).

PMF-009

CARNOT

CARNOT
CEM PERFORMANCE DATA

CLIENT/LOCATION: UCOS - Colma DATE: 6/28/94

BY: [signature]

SYSTEM CONFIGURATION F600				
ANALYZERS IN SERVICE				
ANALYZERS:	O_2	CO_2	CO	NOx
MODEL:	Teledyne	PIR 2000	48	10S
SERIAL NO.:				

PROBE	MAIN	HOT	SAMPLE CONDITIONER	
LENGTH:	6'	4'	CONDENSER-VACUUM SIDE (CHECK FLOW):	✓
LINER MATERIAL:	SS	SS	CONDENSER-PRESSURE SIDE (CHECK FLOW):	✓
HEATED PROBE (Y/N):	NO	NO	CONDENSER TEMPERATURE:	40
HEATED LINE (Y/N):	Yes	Yes	FILTER CONDITION (COND. OR DATE LAST CHANGED):	5/24/94

SAMPLE LINE			SYSTEM LEAK CHECK:	MAIN	HOT
LENGTH:	50'	50'	PRE-TEST (cfh):	0.0	0.0
LINER MATERIAL:	teflon	teflon	POST-TEST (cfh):		
SYSTEM BIAS LINE:	teflon	teflon	LEAK RATE (%) = POST-TEST (cfh) / SYSTEM FLOW RATE (cfm) x 60 x 100 = ____ %		

ON-STACK CONDITIONER		NOx CONVERSION EFFICIENCY	
IN SERVICE (Y/N):	Yes	HIGH CAL NOx	
KNOCK-OUT CONDITION (CHECK FLOW):	✓	HIGH CAL NO (AS FOUND)	1
COOLANT:	ICE	LOW CAL NOx	
		LOW CAL NO (AS FOUND)	1

OPERATING CONDITIONS		
SAMPLE PRESSURE:		SYSTEM RESPONSE TIME CHECK
SAMPLE VACUUM:		UPSCALE: ____ sec.
NOx VACUUM:		DOWNSCALE: ____ sec.

CARNOT

PMF-011

Scott Specialty Gases, Inc.

2600 CAJON BOULEVARD, SAN BERNARDINO, CA 92411 (909) 887-2571 FAX: (909) 887-0549

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
CARNOT
RICK MADRIGAL
15991 RED HILL AVE
TUSTIN, CA 92680

Assay Laboratory
Scott Specialty Gases
2600 Cajon Boulevard
San Bernardino, CA 92411

Purchase Order 1818
Project # 30380 003

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September 1993.

Cylinder Number ALM045739 Certification Date 03-15-94 Exp. Date 03-15-97
Cylinder Pressure+ 2000 PSIG

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
(CARBON DIOXIDE)	15.16 %	± 1 % NIST Traceable
(OXYGEN)	12.45 %	
(Nitrogen)	Balance Gas	

+Do not use when cylinder pressure is below 150 psig.
*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type/Sample No.	Expiration Date	Cylinder Number	Concentration
GMIS	06-94	A018082	18.97 % CO2 IN N2
GMIS	06-94	A6513	12.45 % O2 IN N2

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
CO2:Horiba / OPE-135C / 56553902	02-22-94	NDIR
O2:Horiba / OPE-335 / 850557042	02-25-94	Magnetopneumatic

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components: Carbon Dioxide

First Triad Analysis — Date: 03-15-94 — Response Units: mv

Z1= 0.00	R1= 97.0	T1= 85.9
R2= 97.0	Z2= 0.00	T2= 85.8
Z3= 0.00	T3= 85.8	R3= 97.0

Avg. Conc. of Cust Cyl. 15.16 %

Second Triad Analysis — Date: — Response Units: mv

Z1=	R1=	T1=
R2=	Z2=	T2=
Z3=	T3=	R3=

Avg. Conc. of Cust Cyl.

Calibration Curve — Concentration= Ar^3+Br^2+Cr+D

A =0.000007988
B =0.0002062
C =0.1000
D =-0.0001333

Components: Oxygen

First Triad Analysis — Date: 03-15-94 — Response Units: mv

Z1= 0.00	R1= 94.1	T1= 49.8
R2= 94.1	Z2= 0.00	T2= 49.8
Z3= 0.00	T3= 49.8	R3= 94.1

Avg. Conc. of Cust Cyl. 12.45 %

Second Triad Analysis — Date: — Response Units: mv

Z1=	R1=	T1=
R2=	Z2=	T2=
Z3=	T3=	R3=

Avg. Conc. of Cust Cyl.

Calibration Curve — Concentration= $Ar+B$

A =0.2500
B =-0.004586

Date:	Response Units: mv	
Z1=	R1=	T1=
R2=	Z2=	T2=
Z3=	T3=	R3=

Avg. Conc. of Cust Cyl.

Date:	Response Units: mv	
Z1=	R1=	T1=
R2=	Z2=	T2=
Z3=	T3=	R3=

Avg. Conc. of Cust Cyl.

Concentration=

Special Notes:

ANALYST

Scott Specialty Gases, Inc.

2600 CAJON BOULEVARD, SAN BERNARDINO, CA 92411 (909) 887-2571 FAX (909) 887-0549

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
CARNOT
RICK MADRIGAL
15991 RED HILL AVE
SUITE 110
TUSTIN, CA 92680

Assay Laboratory
Scott Specialty Gases
2600 Cajon Boulevard
San Bernardino, CA 92411

Purchase Order 1914
Project # 30667 009

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards, Procedure G1, September 1993.

Cylinder Number ALM045927 Certification Date 03-30-94 Exp. Date 03-30-97
Cylinder Pressure+ 1900 PSIG

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
(CARBON DIOXIDE)	22.43 %	± 1 % NIST Traceable
(OXYGEN)	8.937 %	
(Nitrogen)	Balance Gas	

+Do not use when cylinder pressure is below 150 psig.
*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type/Sample No.	Expiration Date	Cylinder Number	Concentration
CRM1675	06-94	ALM001136	14.08 % CO2/N2
GMIS	06-94	A10868	9.520 % O2/N2

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
CO2:PIR2000-ACUBLEND	03-24-94	NDIR
O2:Horiba / OPE-335 / 850557042	03-30-94	Magnetopneumatic

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components: Carbon Dioxide

First Triad Analysis

Date: 03-30-94 Response Units: mv

Z1=	0.00	R1=	72.9	T1=	92.2
R2=	72.9	Z1=	0.00	T2=	92.2
Z3=	0.00	T3=	92.2	R3=	72.9

Avg. Conc. of Cust Cyl 22.43 %

Second Triad Analysis

Date: Response Units: mv

Z1=		R1=		T1=	
R2=		Z1=		T2=	
Z3=		T3=		R3=	

Avg. Conc. of Cust Cyl

Calibration Curve

Concentration= $Ax^4+Bx^3-Cx^2+DX+E$

A =-0.000000192
B =-0.000001975
C =0.001882
D =0.08535
E =0.002942

Components: Oxygen

First Triad Analysis

Date: 03-30-94 Response Units: mv

Z1=	0.00	R1=	95.3	T1=	89.4
R2=	95.3	Z2=	0.00	T2=	89.4
Z3=	0.00	T3=	89.3	R3=	95.3

Avg. Conc. of Cust Cyl 8.937 %

Second Triad Analysis

Date: Response Units: mv

Z1=		R1=		T1=	
R2=		Z2=		T2=	
Z3=		T3=		R3=	

Avg. Conc. of Cust Cyl

Calibration Curve

Concentration= Ax + B

A =0.09999
B =0.0004275

Date: Response Units: mv

Z1=		R1=		T1=	
R2=		Z2=		T2=	
Z3=		T3=		R3=	

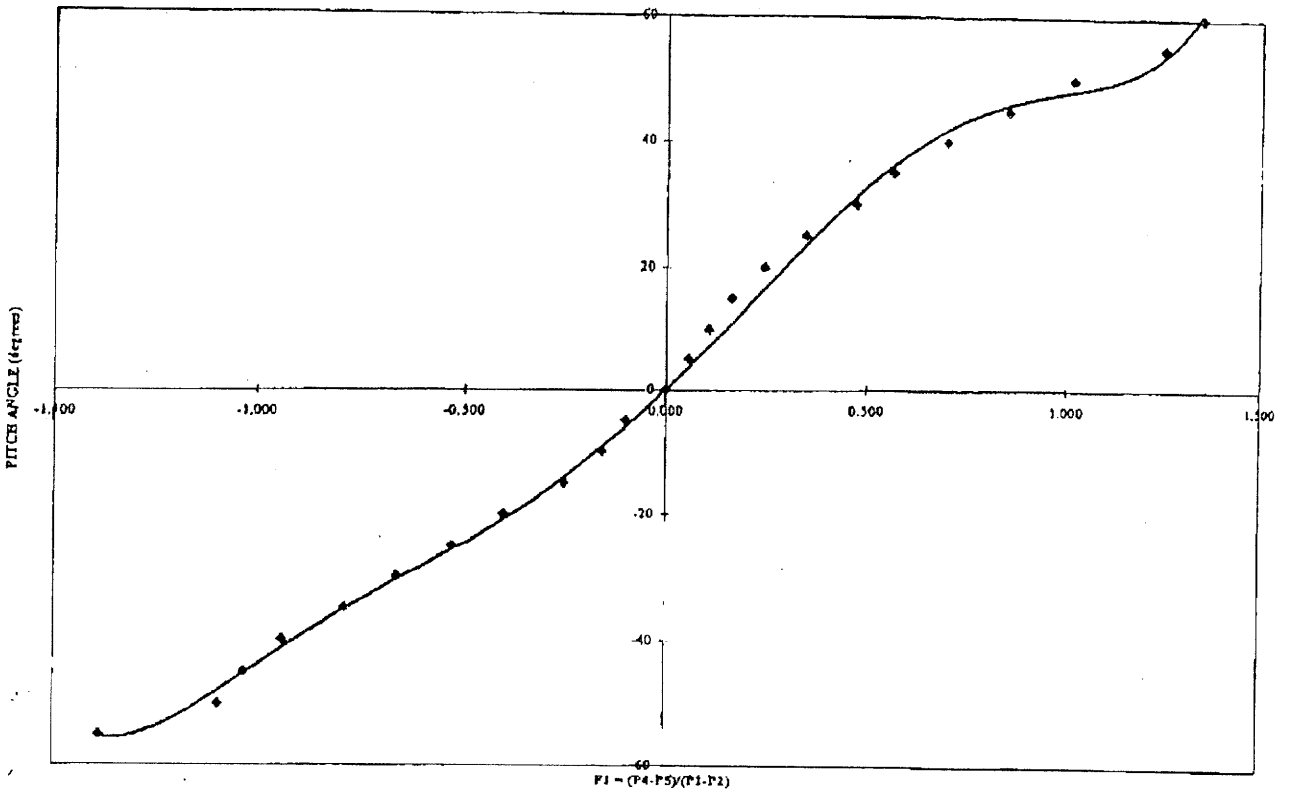
Date: Response Units: mv

Z1=		R1=		T1=	
R2=		Z2=		T2=	
Z3=		T3=		R3=	

Concentration=

Analyst:

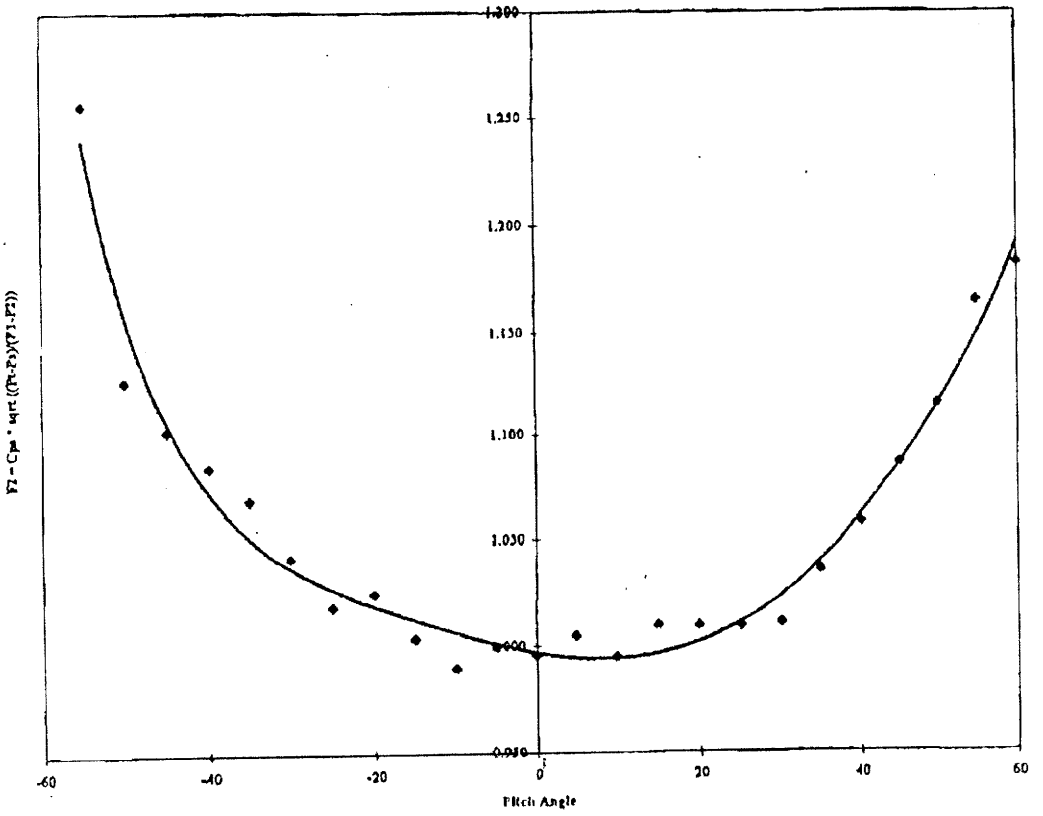
CARNOT
3-DIMENSIONAL VELOCITY PROBE CALIBRATION
PITCH ANGLE vs. F1
PROBE ID: B-2455



Pitch Angle = 63.09X + 23.69X^2 - 24.505X^3 - 33.312X^4 + 7.5203X^5 + 11.669X^6

Performed By: MM/RM
Date: 5/18/94

CARNOT
3-DIMENSIONAL VELOCITY PROBE CALIBRATION
F2 vs. PITCH ANGLE
PROBE ID: B-2455



Performed By: RM/RM
Date: 5/18/94

F2 = 0.997 - 0.0007X + 3E-5X^2 + 8E-7X^3 + 1E-8X^4 - 3E-10X^5 + 3E-12X^6

APPENDIX C
DATA SHEETS

Appendix C.1

Sample Locations

CARNOT

SAMPLING POINT LOCATION DATA - EPA METHOD 1

PLANT: Ucos - Colmac DATA BY: EF

DATE: 6/27/94

TEST LOCATION: Unit 2 Duct

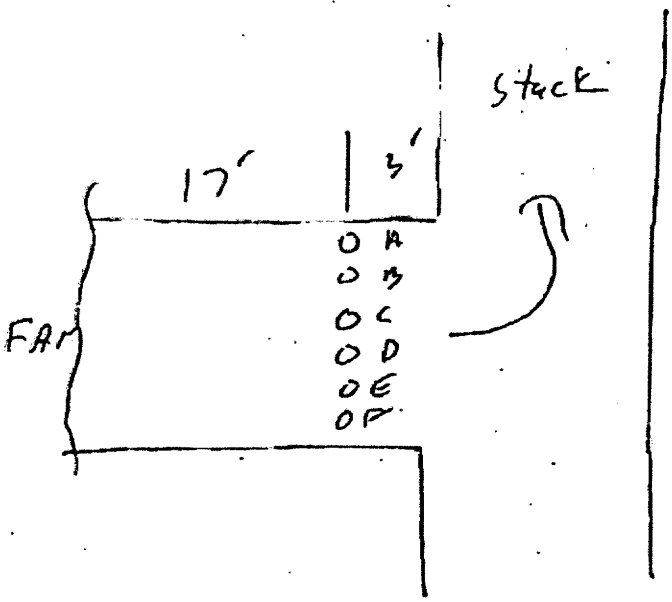


Diagram of Sampling Location

UPSTREAM DIST./DIA.: 17/

DOWNSTREAM DIST./DIA.: 3/

COUPLING LENGTH: 8"

NO. OF SAMPLING PTS.: 42

STACK DIMENSION: 47" x 119"

STACK AREA, FT²: 38.8

*INCHES FROM WALL PLUS COUPLING LENGTH

SAMPLE POINT	% OF DIAMETER	IN. FROM NEAR WALL	IN. FROM NOZZLE*
1		3.9	11.42
2		10.3	19.3
3		17.14	25.14
4		24.	32
5		30.86	38.86
6		37.7	45.71
7		43.5	51.57

PMF-002

CARNOT

Appendix C.2

CEM Data

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: UCOS - Colmac
DATE: 6/28/99 - EP
OPERATOR:
TEST LOCATION: Unit 1 Outlet
TEST NUMBERS: 1-1 thru

AMBIENT TEMP., DB/WB: ~115
BAROMETRIC PRESSURE: 29.80
DUCT STATIC PRESSURE: -0.7
FUEL: Bo Mon

TEST NO.	SAMPLE TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO ___% ___, DRY		
			O_2	O_2	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
		Zero / Span	.3 / 12.2	.1 / 12.4								
1-1	1218 / 1221	A5	6.9	6.9								
	1221 / 1224	A4	7.2	7.1								
	1224 / 1227	A3	6.7	6.7								
	1227 / 1230	A2	7.0	7.2								
	1230 / 1233	A1	7.1	8.0								
	1236 / 1239	B5	6.5	6.5								
	1239 / 1242	B4	6.7	6.7								
	1242 / 1245	B3	6.9	6.6								
	1245 / 1248	B2	6.3	6.2								
	1248 / 1251	B1	6.5	6.5								

COMMENTS:

PIMF-013

CARNOT

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: UCOS - Column
DATE: 6/28/94
OPERATOR: EP
TEST LOCATION: UNIT 1
TEST NUMBERS: 1-1 - Start

AMBIENT TEMP., DB/WB:
BAROMETRIC PRESSURE:
DUCT STATIC PRESSURE:
FUEL: Blo Mos

TEST NO.	SAMPLE TIME	SAMPLE POINT/ CONDITION	Ref — DRY, UNCORRECTED							CORRECTED TO ___% ___ DRY		
			O_2	$\%O_2$	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
	1254/1257	C5	6.6	6.5								
	1257/1300	C4	6.3	6.2								
	1300/1303	C3	6.4	6.4								
	1305/1306	C2	6.9	6.8								
	1306/1309	C1	6.7	6.7								
	1312/1315	D5	6.7	6.6								
	1315/1318	D4	6.7	6.8								
	1318/1321	D3	6.7	6.7								
	1321/1324	D2	6.6	6.6								
	1324/1327	D1	6.7	6.7								

COMMENTS:

CARNOT

PMF-013

(3)

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: UWS-Colmac
DATE: 6/28/94
OPERATOR: SG
TEST LOCATION: Unit 2 Outlet
TEST NUMBERS: 1-1- Stack

AMBIENT TEMP., DB/WB:
BAROMETRIC PRESSURE:
DUCT STATIC PRESSURE:
FUEL:

TEST NO	SAMPLE TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO ___% ___, DRY		
			Ref O_2	O_2	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
1-1	1330/1332	E-5	7.0	6.9								
	1329/1330	E-4	6.6	6.6								
	1336/1335	E-3	6.6	6.6								
	1334/1342	E-2	6.9	6.8								
	1342/1345	E-1	6.7	6.6								
	1348/1351	F-5	6.5	6.5								
	1351/1354	F-4	6.2	6.2								
	1354/1357	F-3	6.8	6.8								
	1357/1400	F-2	6.8	6.8								
	1400/1403	F-1	6.8	6.8								
	1430/1409	A-1	6.5	6.5								
	SYS	ZW/SPAN	0/12.1	.1/12.1								

COMMENTS:

PMF-013

CARNOT

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: UCOS - Colmac
DATE: 6/28/94
OPERATOR: EF
TEST LOCATION: 2-2-CEM
TEST NUMBERS:

AMBIENT TEMP., DB/WB:
BAROMETRIC PRESSURE:
DUCT STATIC PRESSURE:
FUEL:

TEST NO.	SAMPLE TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED REF							CORRECTED TO ___% ___, DRY		
			O_2	O_2	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
	SYS	ZERO SPAN	.3/122	.1/124								
	533/536	F5	7.0	7.0								
	536/538	F4	6.4	6.5								
	939/942	F3	7.3	7.4								
	942/945	F2	7.0	7.0								
	945/948	F1	6.7	6.7								
	951/954	E5	6.5	6.5								
	954/957	E4	6.7	6.8								
	957/1000	E3	7.1	7.1								
	1000/1003	E2	6.9	7.0								
	1003/1006	E1	6.7	6.8								

COMMENTS:

PMF-013

CARNOT

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: UCOS - Colmac
DATE: 6/28/94
OPERATOR: EC
TEST LOCATION:
TEST NUMBERS:

AMBIENT TEMP., DB/WB:
BAROMETRIC PRESSURE:
DUCT STATIC PRESSURE:
FUEL:

TEST NO.	SAMPLE TIME	SAMPLE POINT/ CONDITION	DRY, UNCORRECTED							CORRECTED TO ___% ___, DRY		
			Ref O_2	O_2	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
2-2	1009/1012	D-5	6.9	7.0								
	1012/1015	D-4	6.3	6.4								
	1015/1018	D-3	7.2	7.2								
	1018/1021	D-2	7.7	7.7								
	1021/1024	D-1	7.0	7.0								
	1033/1036	C-5	6.5	6.4								
	1036/1039	C-4	6.6	6.6								
	1039/1042	C-3	6.5	6.6								
	1042/1045	C-2	6.4	6.4								
	1045/1048	C-1	7.4	7.5								

COMMENTS:

CARNOT

PTMF-013

CARNOT
CONTINUOUS EMISSIONS MEASUREMENTS

CLIENT: VCUS - Colma
DATE: 6/28/96
OPERATOR: GS
TEST LOCATION: outlet #2
TEST NUMBERS: 2-2-ST

AMBIENT TEMP., DB/WB: 105
BAROMETRIC PRESSURE: 29.92
DUCT STATIC PRESSURE:
FUEL: Bio Mass

TEST NO.	SAMPLE TIME	SAMPLE POINT/ CONDITION	Ref DRY, UNCORRECTED							CORRECTED TO ___% ___ DRY		
			O_2	O_2	CO	NOx	NO	NO_2	SO_2	CO	NOx	SO_2
	1051 / 1054	B-5	6.0	6.1								
	1054 / 1057	B-4	6.2	6.3								
	1057 / 1100	B-3	6.5	6.6								
	1100 / 1103	B-2	6.7	6.8								
	1103 / 1106	B-1	6.6	6.7								
	1109 / 1112	A-5	7.1	7.3								
	1113 / 1115	A-4	6.7	6.9								
	1115 / 1118	A-3	7.4	7.5								
	1118 / 1121	A-2	6.7	6.8								
	1121 / 1124	A-1	6.4	6.6								
	GAS	ZERO / SPAN	.3	.1								
			12.2	12.4								

COMMENTS:

PMF-013

CARNOT

Appendix C.3

3D Flow Data

CARNOT

3-DIMENSIONAL VELOCITY DATA

Client/Location: ICCS Calmac
Sample Location: Unit 1 outlet
Unit No: 1
Test No: 1-3-3D-traverse
Barometric Pressure (in Hg):
Static Pressure in Stack (iwg):

Date: 6-28-94
Data Taken By: Dave Wimbley
Test Description: 3-D traverse
Pitot I.D. No.:
Pre-Test Leak Check: 0.4
Post-Test Leak Check: 0.4

Time	Port	Point	Yaw Angle (Degrees)	Velocity (P1-P2)	Pitch (P4-P5)	Temperature (F)
	D	7	-10	.45	0	413
		6	-6	.47	0	413
		5	-5	.43	+.01	414
1215		4	0	.40	+.01	414
		3	-1	.39	+.01	416
		2	0	.34	+0	416
		1	0	.31	+.01	415
	C	7	-10	.4	-.04	415
	C	6	-10	.35	-.02	416
		5	-5	.37	-.00	416
		4	0	.35	0	417
		3	+5	.41	+.01	417
		2	+8	.4	+.02	417
		1	+10	.33	+.03	417
	B	7	-5	.56	0	416
		6	-10	.57	0	417
		5	-6	.48	0	417
		4	-8	.34	-.02	417
		3	0	.26	+.03	417
		2	+7	.26	+.03	417
		1	+8	.28	+.01	417

Note: Clockwise rotation of the probe corresponds to a positive yaw angle: > 0 or > 90 degrees.

3D_DATA.XLS
2/14/94
8:03 PM

CARNOT

3-DIMENSIONAL VELOCITY DATA

Client/Location: UCOS Colmac Date: 6-28

Sample Location: unit 1 / outlet Data Taken By: Dave W.

Unit No: 1 Test Description: 3-D traverse

Test No: 1-7-3D-traverse Pitot I.D. No.:

Barometric Pressure (in Hg) 29.80 Pre-Test Leak Check:

Static Pressure in Stack (in.g): Post-Test Leak Check:

Time	Port	Point	Yaw Angle (Degrees)	Velocity (P1-P2)	Pitch (P4-P5)	Temperature (F)
	A	7	-10	.59	-.07	415
		6	-8	.48	-.07	416
		5	-6	.48	-.07	418
		4	0	.5	-.05	418
		3	0	.57	-.04	419
		2	0	.6	-.05	419
		1	0	.6	-.07	419
	E	7	~~+5~~	.57	.0	419
		6	-5	.55	0	420
		5	0	.56	0	420
		4	0	.6	0	420
		3	-3	.58	0	420
		2	-2	.6	~~-.03~~	420
		1	-2	.58	-.02	420
	F	7	-4	.5	-.01	418
		6	0	.6	-.03	418
		5	+2	.55	-.04	419
		4	0	.52	-.04	419
		3	0	.62	-.04	419
		2	0	.62	-.04	419
		1	0	.60	-.03	419

Note: Clockwise rotation of the probe corresponds to a positive yaw angle: > 0 or > 90 degrees.

3D_DATA.XLS
2/14/94
8:03 PM

CARNOT

3-DIMENSIONAL VELOCITY DATA

Client/Location: UCCT

Sample Location: Unit 2 outlet

Unit No: 2

Test No: 2-2-3D

Barometric Pressure (in Hg):

Static Pressure in Stack (iwg): -0.75

Date: 8-28-95

Data Taken By: D. W

Test Description: 3-D

Pitot I.D. No.:

Pre-Test Leak Check:

Post-Test Leak Check:

Time	Port	Point	Yaw Angle (Degrees)	Velocity (P1-P2)	Pitch (P4-P5)	Temperature (F)
1035	A	7	-6	.55	-.05	439
		6	-9	.45	-.05	439
		5	-12	.45	-.05	439
		4	-3	.5	-.05	439
		3	-9	.6	-.04	439
		2	-8	.6	-.05	439
		1	-8	.55	-.00	440
	B	7	+5	.7	-.00	439
		6	-7	.65	0	439
		5	0	.57	0	439
		4	-1	.48	0	439
		3	-2	.72	0	439
		2	-3	.25	0	438
		1	-18	.27	-.02	438
	C	7	0	.41	-.01	437
		6	0	.42	-.02	436
		5	0	.37	-.01	437
		4	-2	.37	+.01	437
		3	-6	.36	+.02	437
		2	-7	.4	+.02	437
		1	-9	.36	+.02	437

Note: Clockwise rotation of the probe corresponds to a positive yaw angle. > 0 or > 90 degrees

3D_DATA.XLS
2/14/94
8:03 PM

CARNOT

3-DIMENSIONAL VELOCITY DATA

Client/Location: VCOS Colmac — Date: 6-27-94

Sample Location: Outlet — Data Taken By: Dave Wonderly

Unit No: 2 — Test Description: 3-D

Test No: 2-2-3D-Vel — Pitot I.D. No.:

Barometric Pressure (in Hg): 29.82 — Pre-Test Leak Check: O.K

Static Pressure in Stack (in.g): — Post-Test Leak Check: O.K

Time	Port	Point	Yaw Angle (Degrees)	Velocity (P1-P2)	Pitch (P4-P5)	Temperature (F)
	F	7	-7°	.55	-.05	
		6	-7°	.57	-.04	446
		5	-7°	.50	-.06	441
		4	-6°	.59	-.03	443
		3	-1	.66	-.03	441
		2	-8°	.60	0	442
		1	-10	.52	+.07	445
	E	7	-9°	.52	0	441
		6	-10°	.52	+.01	442
		5	-5°	.54	+.02	442
		4	-7°	.55	0	442
		3	-3°	.53	0	441
		2	-9°	.53	0	441
		1	-10°	.55	+.02	440
	D	7	0	.49	0	440
		6	+1	.45	+.02	438
		5	-2	.42	+.02	437
		4	0	.39	+.01	437
		3	0	.36	0	437
		2	-3°	.30	-.01	437
		1	+2	.25	0	437

Note: Clockwise rotation of the probe corresponds to a positive yaw angle: > 0 or > 90 degrees.

3D_DATA.XLS
2/14/94
8:03 PM

APPENDIX D
CALCULATIONS

3D VELOCITY - DATA AND WORKSHEET

Client:	UCOS COLMAC	Date:	
Unit:	# 1	Data By:	EF
Sample Location:	Outlet duct	Baro. Pressure, In Hg.:	29.90
Test No.:	1-1-3d	Static Pressure, In WG:	-0.78
Probe ID No.:	B-2131	Abs. Pressure, In Hg.:	29.84
Unit Load:		Average O2, % dry:	6.70
Test Date:	6/28/94	Average CO2, % dry:	12.00
Time (Start/Stop):	0950/1145	Moisture Content, %:	15.00
		Molecular Weight, wet:	28.36

Sample Point		Yaw Angle deg.	Pitch P4-P5 In WG	Total P1-P2 In WG	Stack Temp. F	P4-P5/ P1-P2 In WG	Pitch Angle deg.	P1-Ps/ P1-P2 In WG	Pt-Ps In WG	Result Angle deg.	Velocity uncorr.* fps	Velocity Axial fps
A	7	-10	-0.03	0.58	415	-0.05	-3.2	1.00	0.58	10.5	66.1	65.0
A	6	-8	-0.03	0.48	416	-0.06	-3.8	1.00	0.48	8.9	60.2	59.4
A	5	-6	-0.03	0.48	418	-0.06	-3.8	1.00	0.48	7.1	60.2	59.8
A	4	0	-0.05	0.50	418	-0.10	-6.1	1.00	0.50	6.1	61.5	61.2
A	3	0	-0.04	0.57	419	-0.07	-4.3	1.00	0.57	4.3	65.7	65.5
A	2	0	-0.05	0.60	419	-0.08	-5.1	1.00	0.60	5.1	67.4	67.2
A	1	0	-0.03	0.60	419	-0.05	-3.1	1.00	0.60	3.1	67.4	67.3
E	7	-5	0.00	0.53	419	0.00	0.0	1.00	0.53	5.0	63.2	63.0
E	6	-8	0.00	0.55	420	0.00	0.0	1.00	0.55	8.0	64.4	63.8
E	5	0	0.00	0.56	420	0.00	0.0	1.00	0.56	0.0	65.0	65.0
E	4	0	0.00	0.60	420	0.00	0.0	1.00	0.60	0.0	67.3	67.3
E	3	-3	0.00	0.58	420	0.00	0.0	1.00	0.58	3.0	66.2	66.1
E	2	-2	0.03	0.60	420	0.05	3.2	1.00	0.60	3.8	67.2	67.1
E	1	-2	0.02	0.58	420	0.03	2.2	1.00	0.58	3.0	66.1	66.0
F	7	-4	-0.01	0.50	418	-0.02	-1.3	1.00	0.50	4.2	61.4	61.2
F	6	0	-0.03	0.60	418	-0.05	-3.1	1.00	0.60	3.1	67.3	67.2
F	5	2	-0.04	0.55	419	-0.07	-4.5	1.00	0.55	4.9	64.5	64.3
F	4	0	-0.04	0.52	419	-0.08	-4.7	1.00	0.52	4.7	62.8	62.5
F	3	0	-0.04	0.62	419	-0.06	-4.0	1.00	0.62	4.0	68.5	68.3
F	2	0	-0.04	0.62	419	-0.06	-4.0	1.00	0.62	4.0	68.5	68.3
F	1	0	-0.03	0.60	419	-0.05	-3.1	1.00	0.60	3.1	67.4	67.3
D	7	-10	0.00	0.45	413	0.00	0.0	1.00	0.45	10.0	58.1	57.2
D	6	-6	0.01	0.47	413	0.02	1.4	1.00	0.47	6.2	59.3	59.0
D	5	-5	0.01	0.43	414	0.02	1.5	1.00	0.43	5.2	56.8	56.5
D	4	0	0.01	0.40	414	0.03	1.6	1.00	0.40	1.6	54.7	54.7
D	3	1	0.01	0.39	416	0.03	1.6	1.00	0.39	1.9	54.1	54.1
D	2	0	0.00	0.34	416	0.00	0.0	1.00	0.34	0.0	50.6	50.6
D	1	0	0.01	0.31	415	0.03	2.1	1.00	0.31	2.1	48.2	48.2
C	7	-10	-0.04	0.40	415	-0.10	-6.1	1.00	0.40	11.7	54.9	53.8
C	6	-10	-0.02	0.35	416	-0.06	-3.5	1.00	0.35	10.6	51.4	50.5
C	5	-5	0.00	0.37	416	0.00	0.0	1.00	0.37	5.0	52.7	52.5
C	4	0	0.00	0.35	417	0.00	0.0	1.00	0.35	0.0	51.3	51.3
C	3	5	0.01	0.41	417	0.02	1.6	1.00	0.41	5.2	55.5	55.3
C	2	8	0.02	0.40	417	0.05	3.2	1.00	0.40	8.6	54.8	54.2
C	1	10	0.03	0.33	417	0.09	5.9	0.99	0.33	11.6	49.8	48.7
B	7	-9	0.00	0.58	416	0.00	0.0	1.00	0.58	9.0	66.0	65.2
B	6	-10	0.00	0.57	417	0.00	0.0	1.00	0.57	10.0	65.5	64.5
B	5	-6	0.00	0.48	417	0.00	0.0	1.00	0.48	6.0	60.1	59.8
B	4	-8	0.02	0.34	417	0.06	3.8	0.99	0.34	8.8	50.5	49.9
B	3	0	0.03	0.26	417	0.12	7.6	0.99	0.26	7.6	44.2	43.8
B	2	7	0.03	0.26	417	0.12	7.6	0.99	0.26	10.3	44.2	43.5
B	1	8	0.01	0.28	417	0.04	2.3	1.00	0.28	8.3	45.9	45.4

RESULTS

0.48

Yaw Angle:	2.0 degrees	Stack Temperature:	417 F
Pitch Angle:	-0.4 degrees	Velocity*:	59.45 fps (feet per sec.)
Resultant Angle:	5.6 degrees	Axial Velocity:	59.08 fps
Standard Deviation:	3.3 degrees		

*velocity in the direction of flow

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15991 Red Hill Ave., Suite 110
714-259-9520
FAX 714-259-0372

40985.XLS/1-1 3d

STRATIFICATION CHECK

Client: UCOS COLMAC
Project #: 1409-40950
Unit No: 1.0
Date: 6/28/94

Point	O_2 pt	Ref O_2	% Diff	Point	O_2 pt	Ref O_2	% Diff
A5	6.9	6.9	0.0%	D5	6.5	6.4	-1.6%
A4	7.2	7.1	-1.4%	D4	6.6	6.6	0.0%
A3	6.7	6.7	0.0%	D3	6.7	6.7	0.0%
A2	7.0	7.2	2.8%	D2	6.6	6.6	0.0%
A1	6.5	6.5	0.0%	D1	6.7	6.7	0.0%
B5	6.5	6.5	0.0%	E5	7.0	6.9	-1.4%
B4	6.7	6.7	0.0%	E4	6.6	6.6	0.0%
B3	6.7	6.6	-1.5%	E3	6.6	6.6	0.0%
B2	6.3	6.2	-1.6%	E2	6.9	6.8	-1.5%
B1	6.5	6.5	0.0%	E1	6.7	6.6	-1.5%
C5	6.6	6.5	-1.5%	F5	6.5	6.5	0.0%
C4	6.3	6.2	-1.6%	F4	6.2	6.2	0.0%
C3	6.4	6.4	0.0%	F3	6.8	6.8	0.0%
C2	6.9	6.8	-1.5%	F2	6.8	6.8	0.0%
C1	6.7	6.7	0.0%	F1	6.8	6.8	0.0%

O2 Stratification= -0.4%

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15991 Red Hill Ave. Suite 110
Tustin, California 92680
714-259-9520
FAX 714-259-0372

3D VELOCITY - DATA AND WORKSHEET

Client:	UCOS COLMAC	Date:	
Unit:	# 2	Data By:	EF
Sample Location:	Outlet duct	Baro. Pressure, in Hg.:	29.90
Test No.:	2-2-3d	Static Pressure, in WC:	-0.78
Probe ID No.:	B-2131	Abs. Pressure, in Hg:	29.84
Unit Load:		Average O2, % dry:	6.70
Test Date:	6/28/94	Average CO2, % dry:	12.00
Time (Start/Stop):	0950/1145	Moisture Content, %:	15.00
		Molecular Weight, wet:	28.36

Sample Point		Yaw Angle deg.	Pitch P4-P5 in WG	Total P1-P2 in WG	Stack Temp F	P4-P5/ P1-P2 in WG	Pitch Angle deg.	P1-Ps/ P1-P2 in WG	P1-Ps in WG	Result Angle deg.	Velocity uncorr.* fps	Axial fps
A	7	-6	-0.05	0.55	439	-0.09	-5.5	1.00	0.55	8.1	65.3	64.6
A	6	-9	-0.05	0.45	439	-0.11	-6.7	1.00	0.45	11.2	59.1	58.0
A	5	-12	-0.05	0.45	439	-0.11	-6.7	1.00	0.45	13.7	59.1	57.4
A	4	-3	-0.05	0.50	439	-0.10	-6.1	1.00	0.50	6.8	62.3	61.8
A	3	-9	-0.04	0.60	439	-0.07	-4.1	1.00	0.60	9.9	68.1	67.1
A	2	-8	-0.05	0.60	439	-0.08	-5.1	1.00	0.60	9.5	68.2	67.3
A	1	-8	0.00	0.55	440	0.00	0.0	1.00	0.55	8.0	65.2	64.5
B	7	5	0.00	0.70	439	0.00	0.0	1.00	0.70	5.0	73.5	73.2
B	6	-3	0.00	0.65	439	0.00	0.0	1.00	0.65	3.0	70.8	70.7
B	5	0	0.00	0.57	439	0.00	0.0	1.00	0.57	0.0	66.3	66.3
B	4	-1	0.00	0.48	439	0.00	0.0	1.00	0.48	1.0	60.9	60.8
B	3	-2	0.00	0.32	439	0.00	0.0	1.00	0.32	2.0	49.7	49.7
B	2	-3	0.00	0.25	438	0.00	0.0	1.00	0.25	3.0	43.9	43.8
B	1	-15	-0.02	0.27	438	-0.07	-4.5	1.00	0.27	15.7	45.7	44.0
C	7	0	-0.01	0.41	437	-0.02	-1.5	1.00	0.41	1.5	56.2	56.2
C	6	0	-0.02	0.42	436	-0.05	-2.9	1.00	0.42	2.9	56.9	56.8
C	5	0	-0.02	0.37	437	-0.05	-3.3	1.00	0.37	3.3	53.4	53.3
C	4	-2	-0.01	0.37	437	-0.03	-1.7	1.00	0.37	2.6	53.4	53.3
C	3	-6	0.02	0.36	437	0.06	3.6	0.99	0.36	7.0	52.6	52.2
C	2	-3	0.02	0.40	437	0.05	3.2	1.00	0.40	4.4	55.4	55.3
C	1	-9	0.02	0.36	437	0.06	3.6	0.99	0.36	9.7	52.6	51.8
F	7	-7	-0.05	0.55	440	-0.09	-5.5	1.00	0.55	8.9	65.3	64.5
F	6	-3	-0.04	0.53	440	-0.08	-4.6	1.00	0.53	5.5	64.1	63.8
F	5	-6	-0.06	0.50	441	-0.12	-7.2	1.00	0.50	9.4	62.4	61.5
F	4	-1	-0.03	0.59	443	-0.05	-3.1	1.00	0.59	3.3	67.7	67.6
F	3	-8	-0.03	0.66	441	-0.05	-2.8	1.00	0.66	8.5	71.5	70.7
F	2	-10	0.00	0.60	442	0.00	0.0	1.00	0.60	10.0	68.1	67.1
F	1	-9	0.07	0.52	445	0.13	8.9	0.99	0.52	12.6	63.4	61.9
E	7	-10	0.00	0.52	441	0.00	0.0	1.00	0.52	10.0	63.4	62.4
E	6	-5	0.01	0.52	442	0.02	1.2	1.00	0.52	5.1	63.4	63.2
E	5	-7	0.02	0.54	442	0.04	2.4	1.00	0.54	7.4	64.6	64.1
E	4	-3	0.00	0.55	441	0.00	0.0	1.00	0.55	3.0	65.2	65.1
E	3	-9	0.00	0.53	441	0.00	0.0	1.00	0.53	9.0	64.0	63.2
E	2	-10	0.00	0.53	441	0.00	0.0	1.00	0.53	10.0	64.0	63.0
E	1	0	0.02	0.55	440	0.04	2.3	1.00	0.55	2.3	65.1	65.1
D	7	1	0.00	0.49	440	0.00	0.0	1.00	0.49	1.0	61.5	61.5
D	6	-2	0.02	0.45	438	0.04	2.8	1.00	0.45	3.5	58.8	58.7
D	5	0	0.02	0.42	437	0.05	3.1	1.00	0.42	3.1	56.8	56.7
D	4	0	0.01	0.39	437	0.03	1.6	1.00	0.39	1.6	54.8	54.7
D	3	0	0.00	0.36	437	0.00	0.0	1.00	0.36	0.0	52.6	52.6
D	2	-3	-0.01	0.30	437	-0.03	-2.1	1.00	0.30	3.6	48.1	48.0
D	1	2	0.00	0.25	437	0.00	0.0	1.00	0.25	2.0	43.9	43.8

RESULTS

Yaw Angle:	4.4 degrees	Stack Temperature:	439 F
Pitch Angle:	-1.0 degrees	Velocity*:	60.18 fps (feet per sec.)
Resultant Angle:	5.9 degrees	Axial Velocity:	59.71 fps
Standard Deviation:	4.0 degrees		

*velocity in the direction of flow

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15991 Red Hill Ave., Suite 110
Tustin, California 92680
714-259-9520
FAX 714-259-0372

STRATIFICATION CHECK

Client: UCOS COLMAC
Project #: 1409-40985
Unit No: 2
Date: 6/28/94

Point	O_2 pt	Ref O_2	% Diff	Point	O_2 pt	Ref O_2	% Diff
F5	7.0	7.0	0.0%	C5	6.5	6.4	-1.6%
F4	6.4	6.5	1.5%	C4	6.6	6.6	0.0%
F3	7.3	7.4	1.4%	C3	6.5	6.6	1.5%
F2	7.0	7.0	0.0%	C2	6.4	6.4	0.0%
F1	6.7	6.7	0.0%	C1	7.4	7.5	1.3%
E5	6.5	6.5	0.0%	B5	6.0	6.1	1.6%
E4	6.7	6.8	1.5%	B4	6.2	6.3	1.6%
E3	7.1	7.1	0.0%	B3	6.5	6.6	1.5%
E2	6.9	7.0	1.4%	B2	6.7	6.8	1.5%
E1	6.7	6.8	1.5%	B1	6.6	6.7	1.5%
D5	6.9	7.0	1.4%	A5	7.1	7.3	2.7%
D4	6.3	6.4	1.6%	A4	6.7	6.9	2.9%
D3	7.2	7.2	0.0%	A3	7.4	7.5	1.3%
D2	7.7	7.7	0.0%	A2	6.7	6.8	1.5%
D1	7.0	7.0	0.0%	A1	6.4	6.6	3.0%

O2 Stratification= 1.0%

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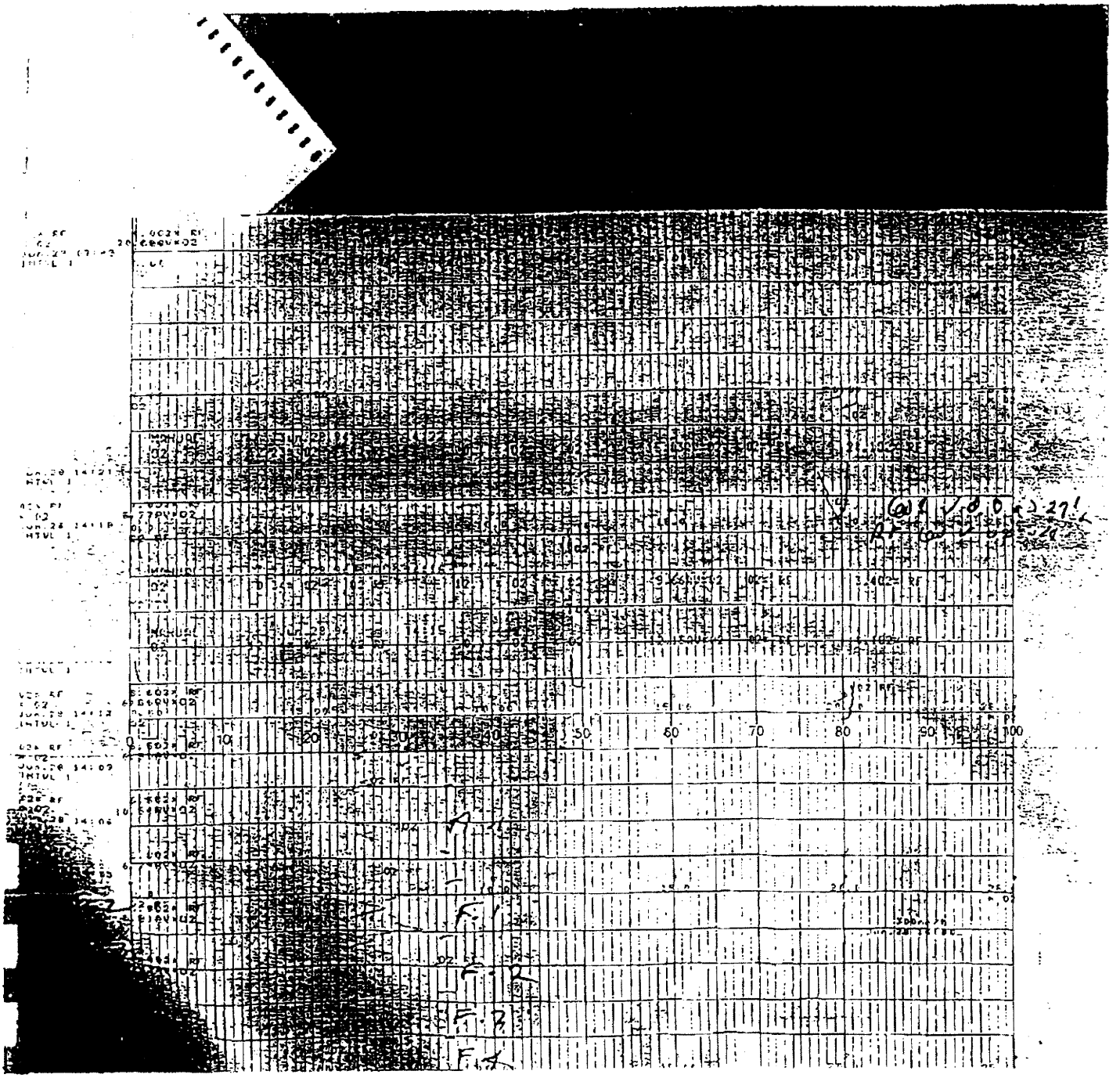
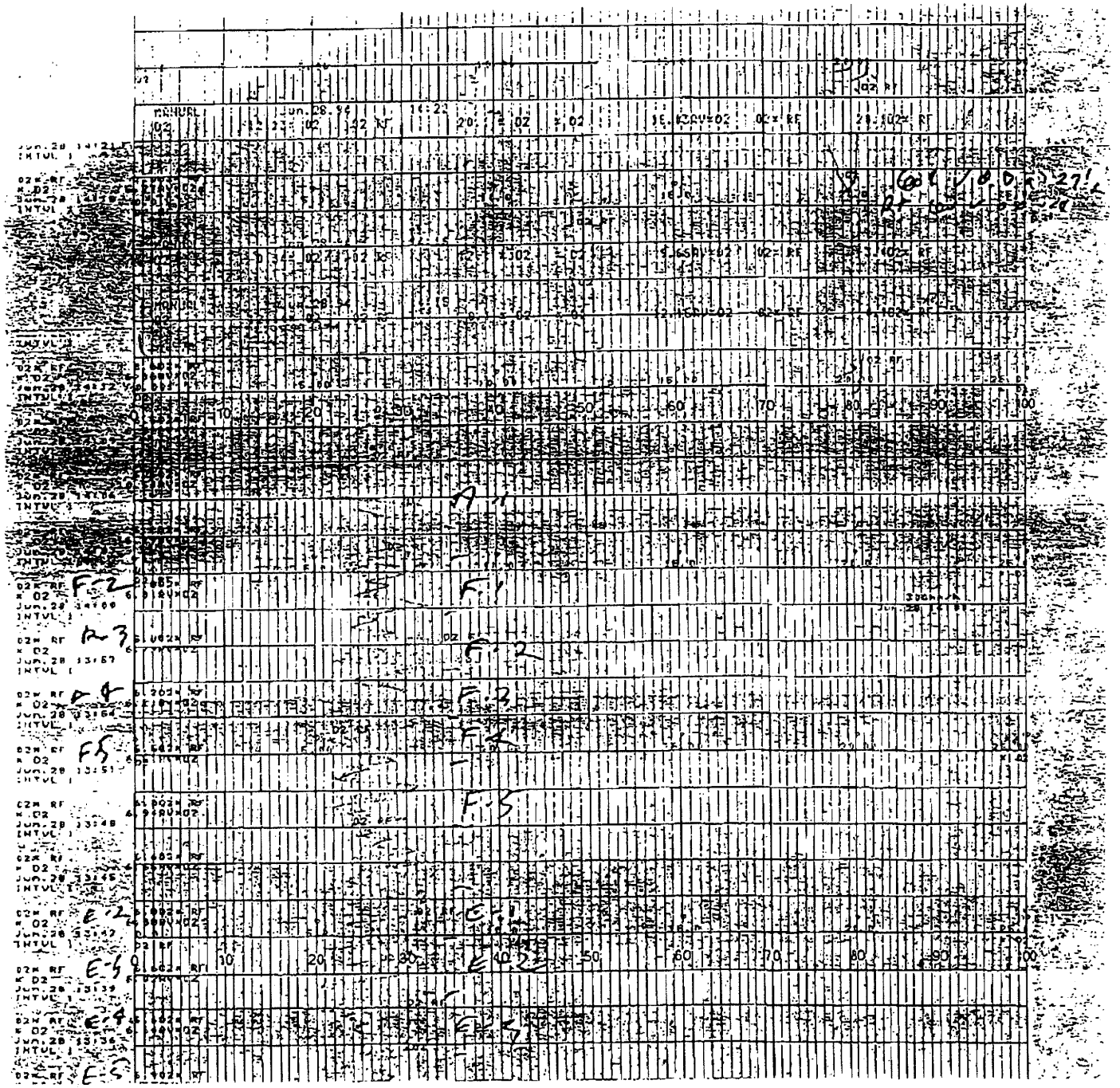
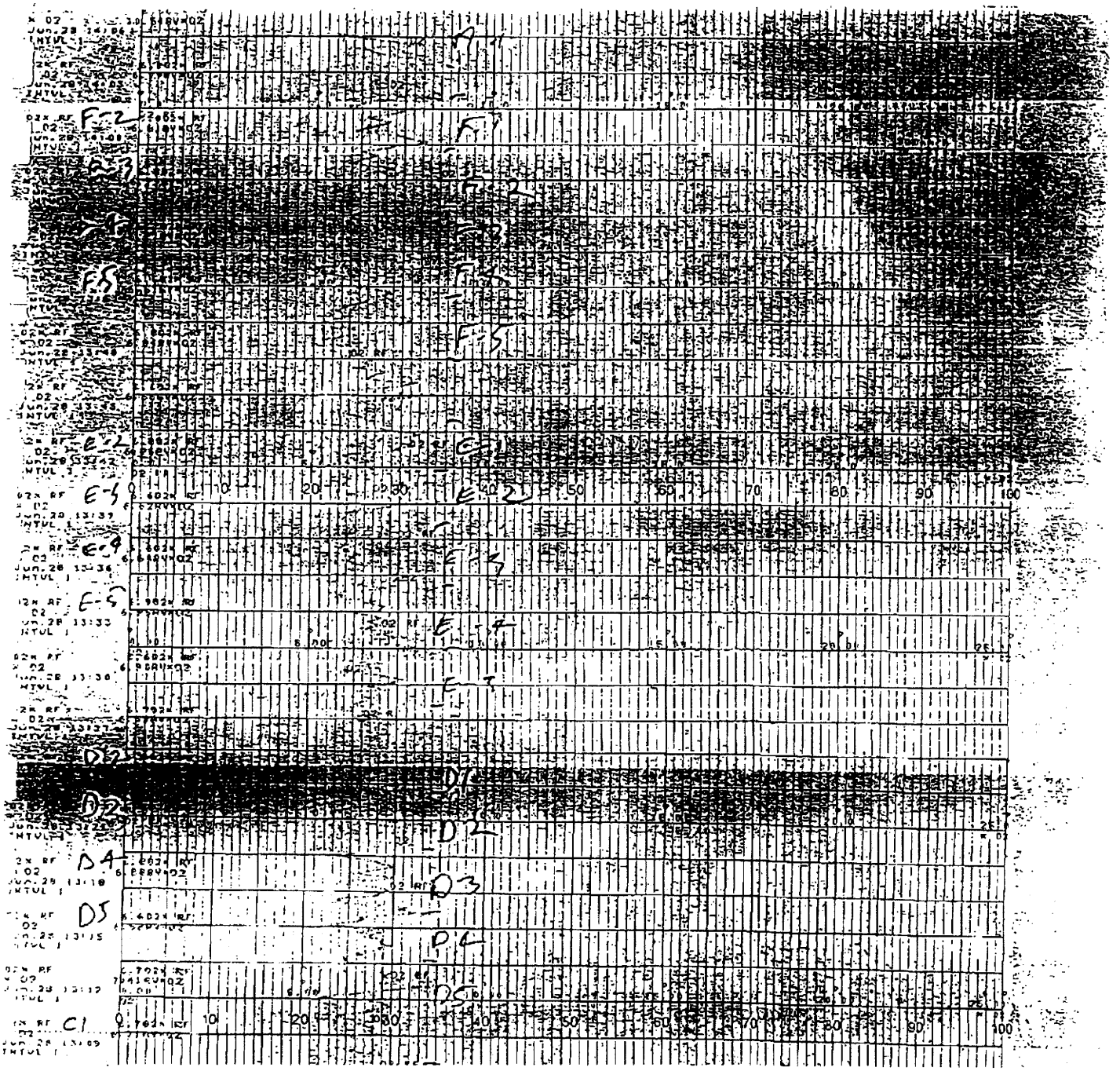
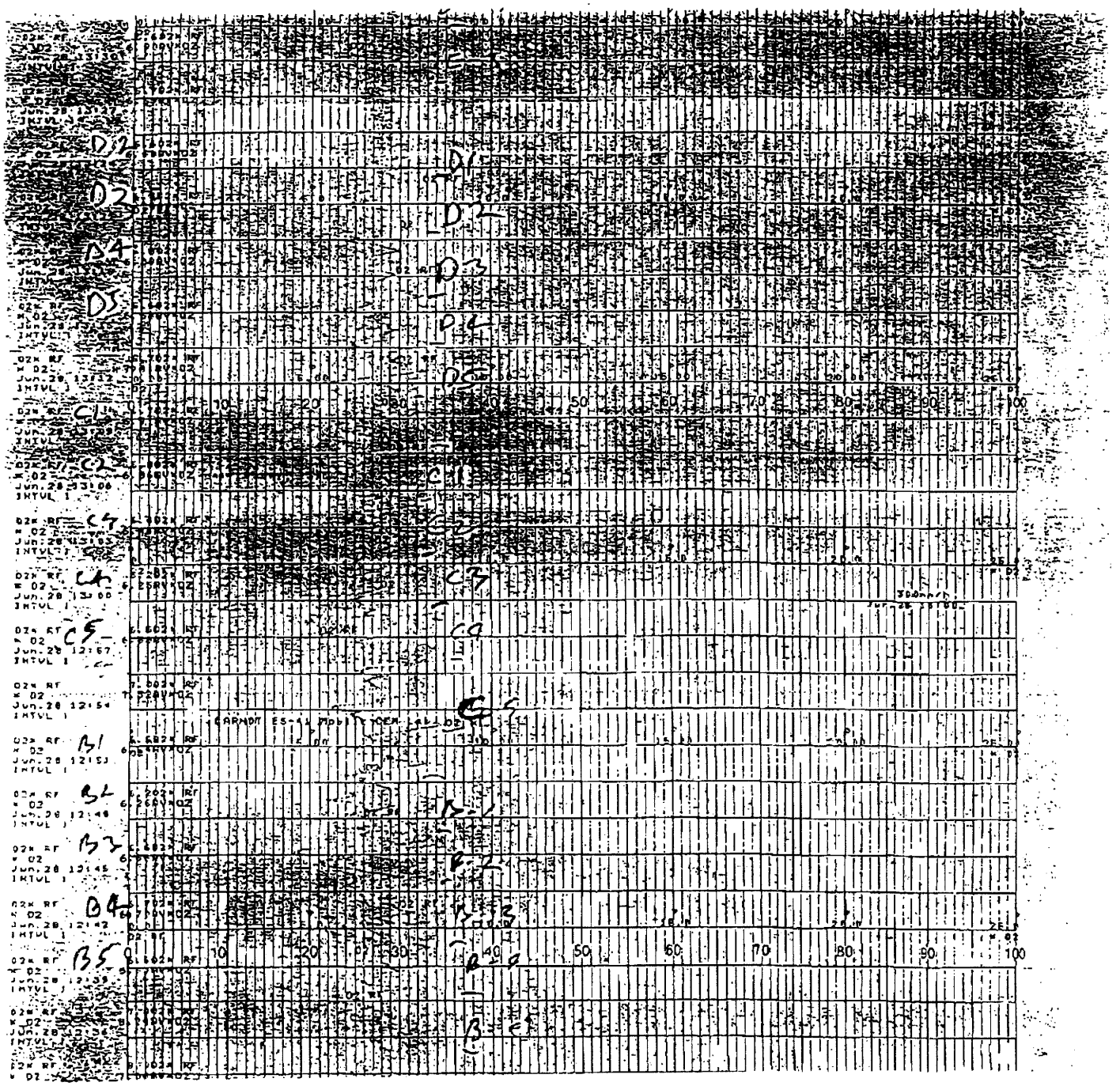
15991 Red Hill Ave. Suite 110
Tustin, California 92680
714-259-9520
FAX 714-259-0372

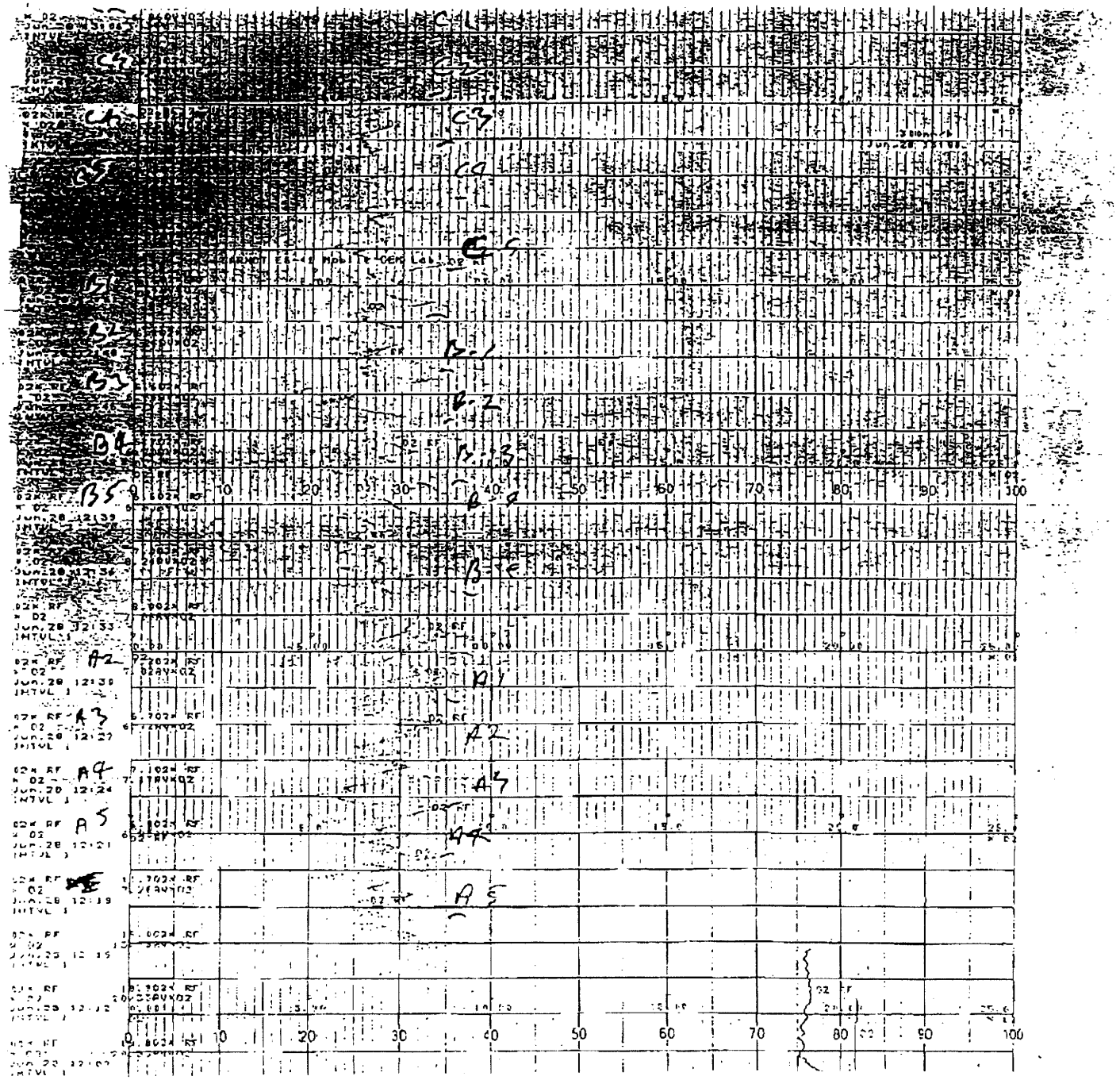
APPENDIX E
STRIP CHARTS

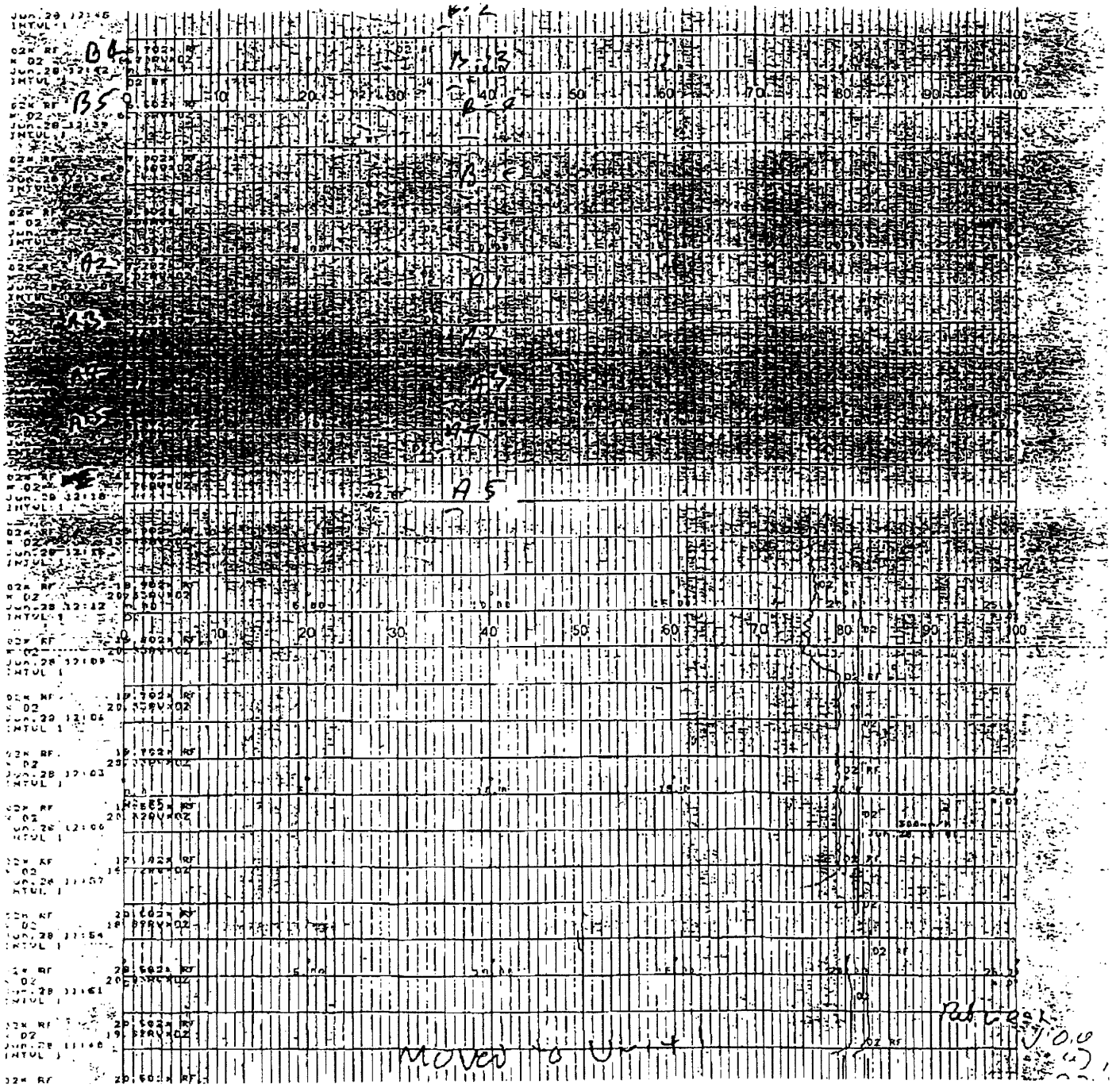


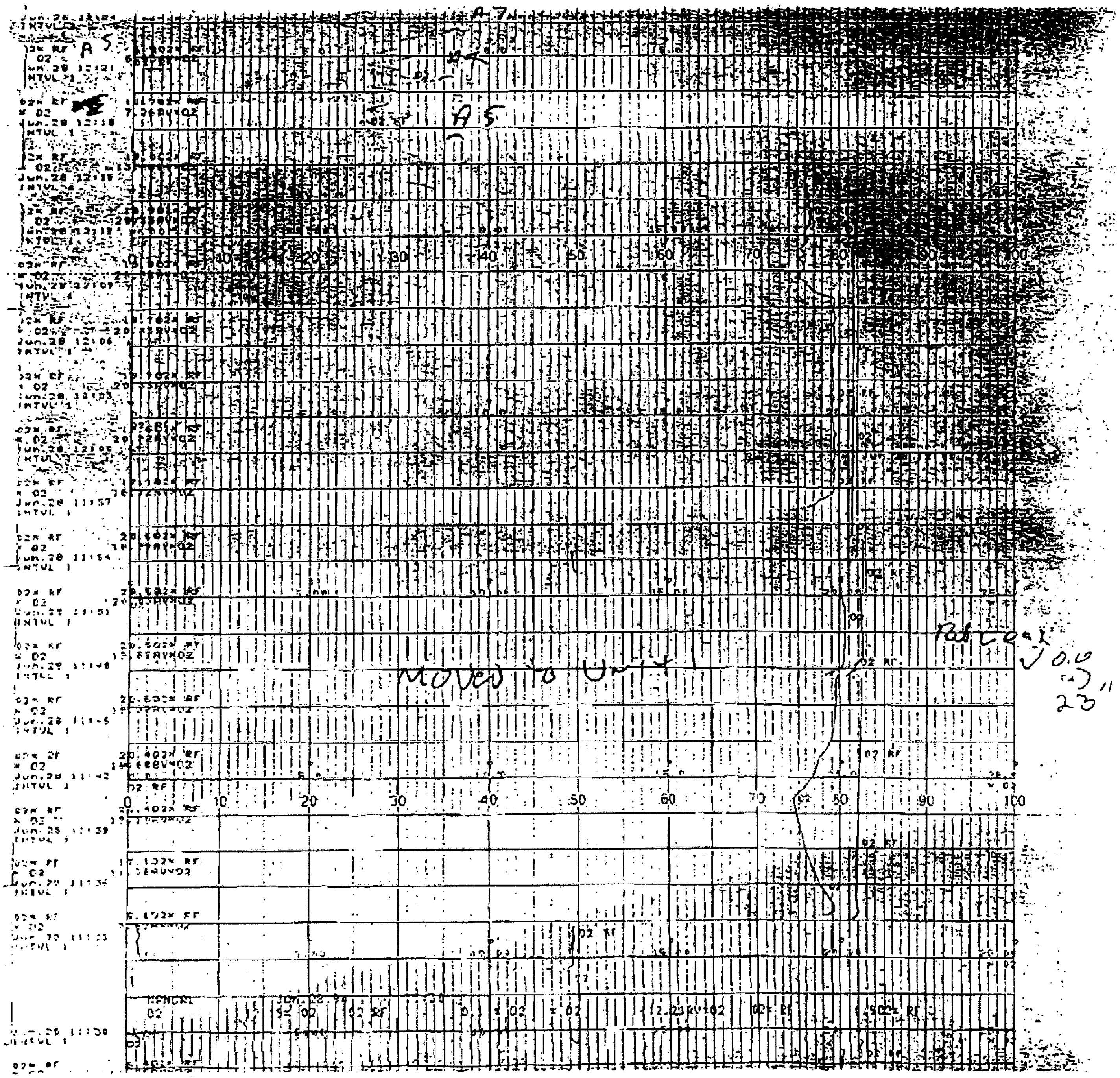








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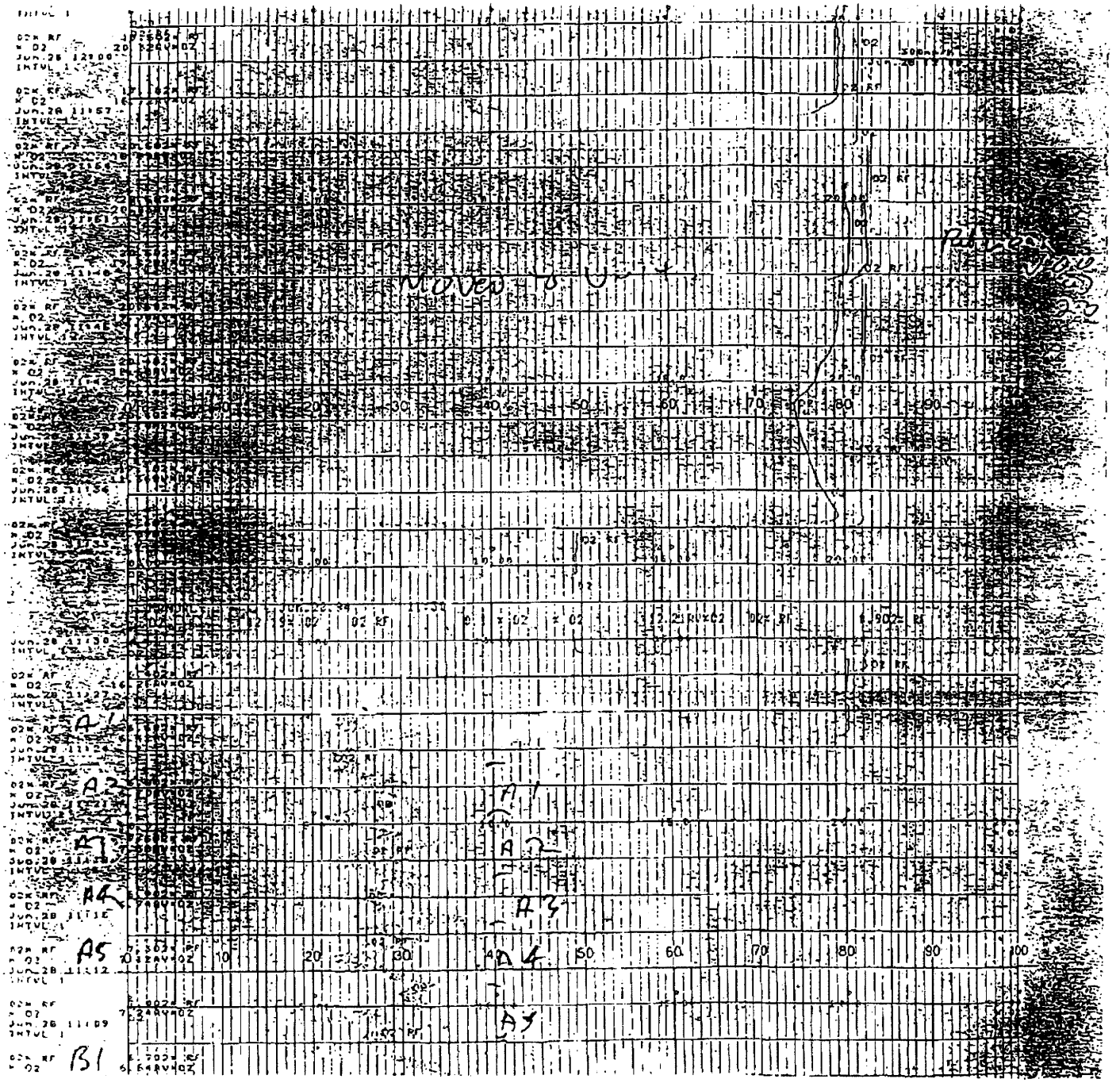
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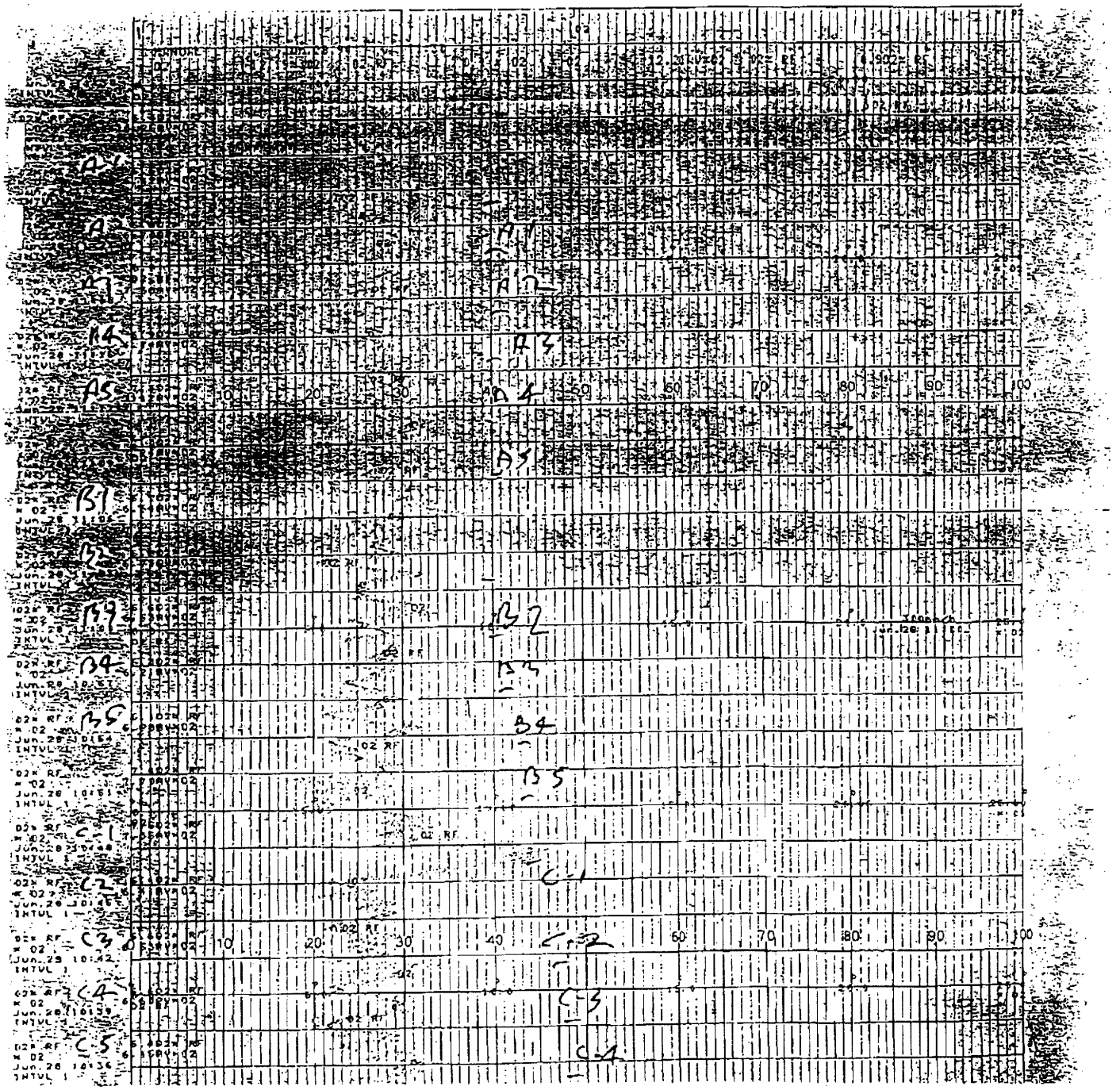

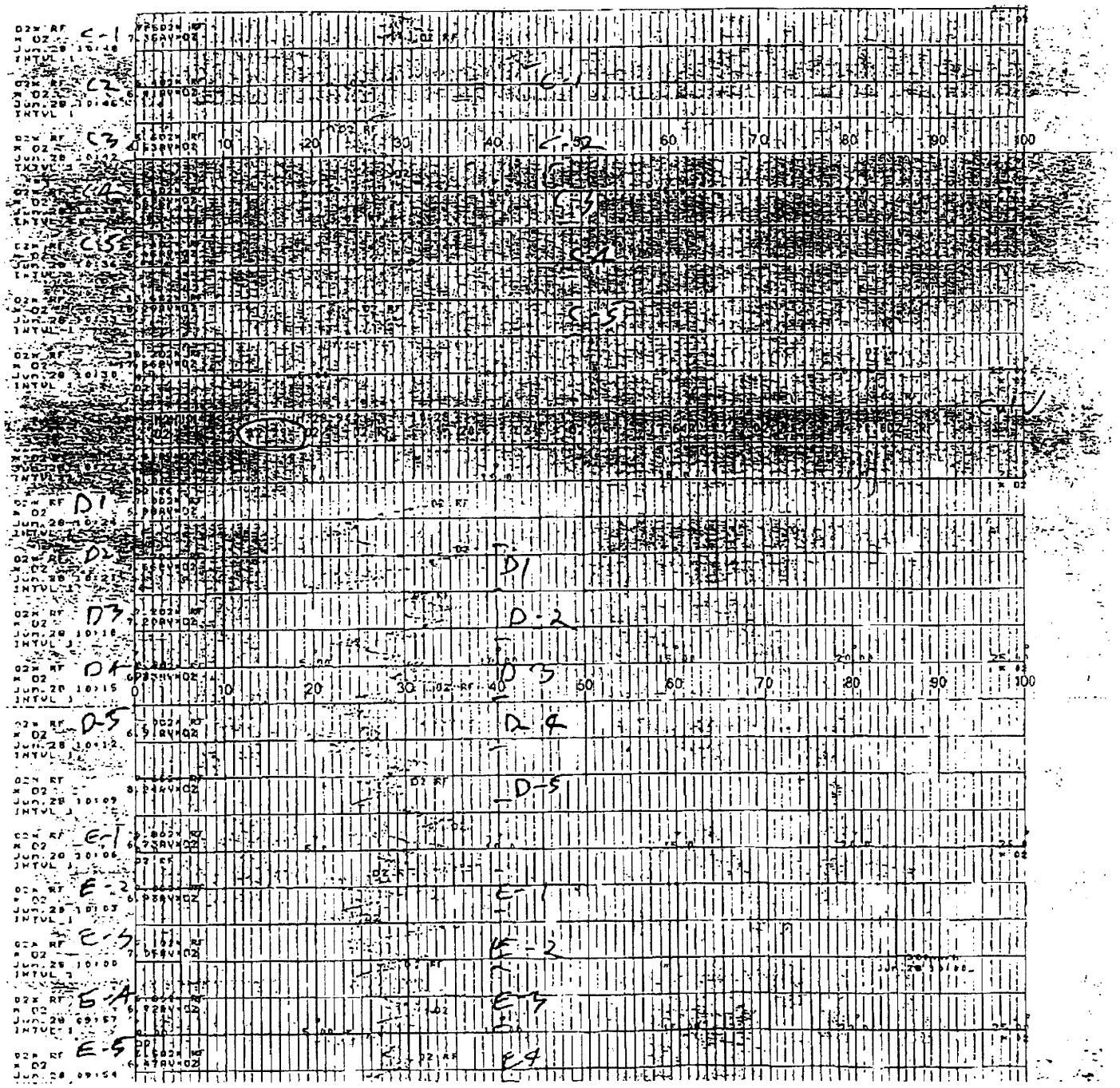
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C-2
C-3
C-4
C-5
D-1
D-2
D-3
D-4
D-5
E-1
E-2
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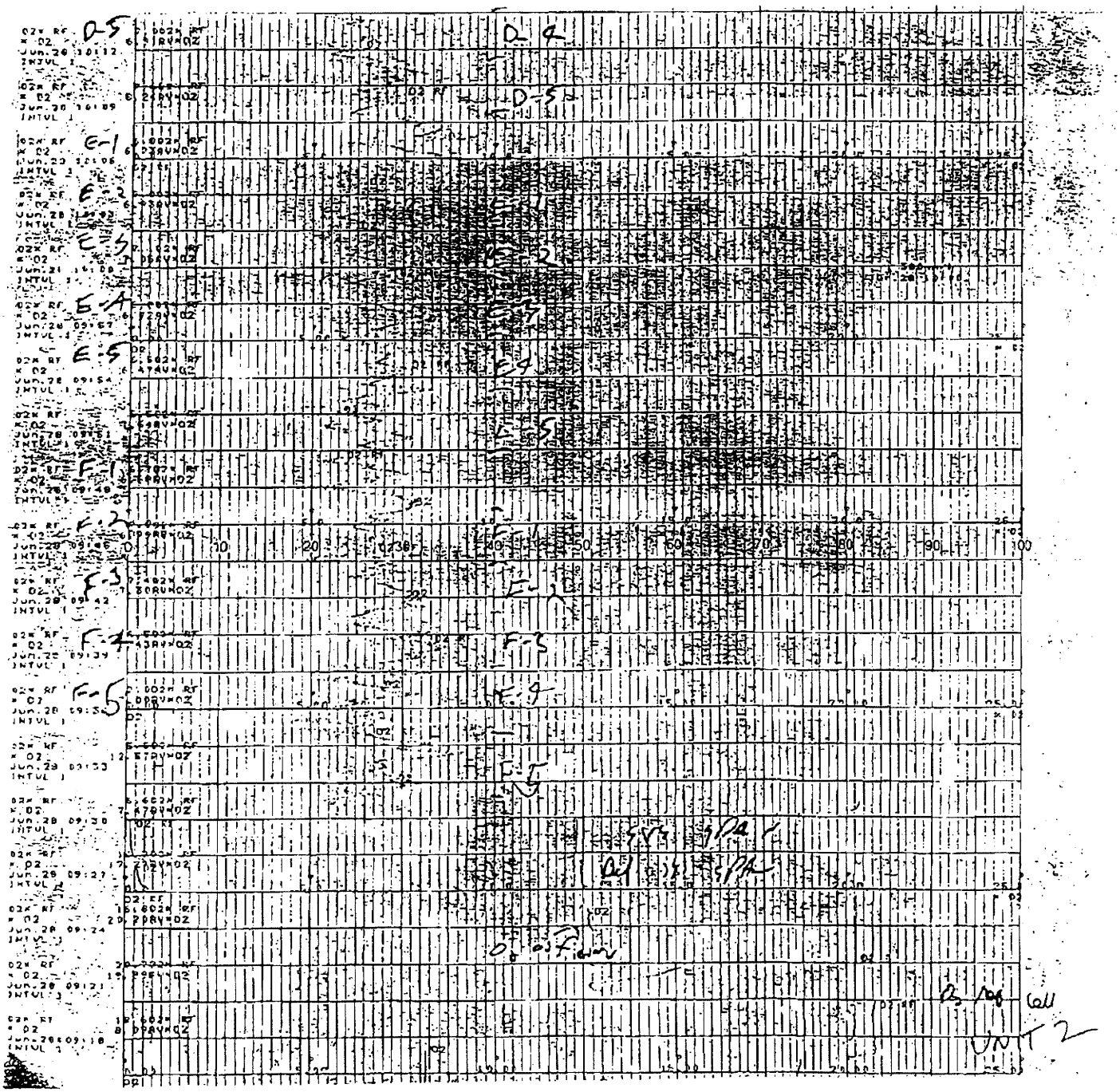
10
20
30
40
50
60
70
80
90
100



APPENDIX C
GENERAL EMISSIONS CALCULATIONS

GENERAL EMISSIONS CALCULATIONS

I. Stack Gas Velocity

A. Stack gas molecular weight, lb/lb-mole

$MW_{dry} = 0.44 * \%\ CO_2 + 0.32 * \%\ O_2 + 0.28 * \%\ N_2$

$MW_{wet} = MW_{dry} * (1 - B_{wo}) + 18 * B_{wo}$

B. Absolute stack pressure, iwg

$$P_s = P_{bar} + \frac{P_{sg}}{13.6}$$

C. Stack gas velocity, ft/sec

$$V_s = 2.9 * C_p * \sqrt{\Delta P} * \sqrt{T_s} * \sqrt{\frac{29.92 - 28.95}{P_s * MW_{wet}}}$$

II. Moisture

A. Sample gas volume, dscf

$$V_{mstd} = 0.03342 * V_m * \left(P_{bar} + \frac{\Delta H}{13.6}\right) * \frac{T_{ref}}{T_m} * Y_d$$

B. Water vapor volume, scf

$$V_{wstd} = 0.0472 * V_{ic} * \frac{T_{ref}}{528°R}$$

C. Moisture content, dimensionless

$$B_{wo} = \frac{V_{wstd}}{(V_{mstd} + V_{wstd})}$$

III. Stack Gas Volumetric Flow Rate

A. Actual stack gas volumetric flow rate, wacfm

$Q = V_s * A_s * 60$

B. Standard stack gas flow rate, dscfm

$$Q_{sd} = Q * (1 - B_{wo}) * \frac{T_{ref}}{T_s} * \frac{P_s}{29.92}$$

IV. Gaseous Mass Emission Rates, lb/hr

$$M = \frac{ppm * MW_i * Q_{sd} * 60}{SV * 10^6}$$

V. Emission Rates, lb/MMBtu

$$\frac{lb}{MMBtu} = \frac{ppm * MW_i * F}{SV * 10^6} * \frac{20.9}{20.9 - \%\ O_2}$$

VI. Percent Isokinetic

$$I = \frac{17.32 * T_s\ (V_{mstd})}{(1 - B_{wo})\ 0 * V_s * P_s * Dn^2} * \frac{520°R}{T_{ref}}$$

VII. Particulate Emissions

(a) Grain loading, gr/dscf
$C = 0.01543\ (M_n/V_{m\ std})$

(b) Grain loading at 12% CO_2, gr/dscf
$C_{12\%\ CO_2} = C\ (12/\%\ CO_2)$

(c) Mass emissions, lb/hr
$M = C * Q_{sd} * (60\ min/hr) / (7000\ gr/lb)$

(d) Particulate emission factor

$$lb/10^6\ Btu = Cx \frac{1\ lb}{7000\ gr} * F * \frac{20.9}{20.9 - \%\ O_2}$$

Nomenclature:

A_s	=	stack area, ft^2
B_{wo}	=	flue gas moisture content, dimensionless
$C_{12\%CO2}$	=	particulate grain loading, gr/dscf corrected to 12% CO_2
C	=	particulate grain loading, gr/dscf
C_p	=	pitot calibration factor, dimensionless
Dn	=	nozzle diameter, inches
F	=	fuel F-Factor, dscf/MMBtu @ 0% O_2
H	=	orifice differential pressure, iwg
I	=	% isokinetics
M_n	=	mass of collected particulate, mg
M_i	=	mass emission rate of specie i, lb/hr
MW	=	molecular weight of flue gas, lb/lb-mole
M_{wi}	=	molecular weight of specie i:
	SO_2:	64
	NO_x:	46
	CO:	28
	HC:	16
0	=	sample time, minutes
ΔP	=	average velocity head, iwg = $(\sqrt{\Delta P})^2$
P_{bar}	=	barometric pressure, inches Hg
P_s	=	stack absolute pressure, inches Hg
P_{sg}	=	stack static pressure, iwb
Q	=	wet stack flow rate at actual conditions, wacfm
Q_{sd}	=	dry standard stack flow rate, dscfm
SV	=	specific molar volume of an ideal gas at standard conditions, ft^3/lb-mole
T_m	=	meter temperature, °R
T_{ref}	=	reference temperature, °R
T_s	=	stack temperature, °R
V_s	=	stack gas velocity, ft/sec
V_{lc}	=	volume of liquid collected in impingers, ml
V_m	=	uncorrected dry meter volume, dcf
V_{mstd}	=	dry meter volume at standard conditions, dscf
V_{wstd}	=	volume of water vapor at standard conditions, scf
Y_d	=	meter calibration coefficient

APPENDIX D
EPA PART 71 OPERATING PERMIT

TITLE V PERMIT TO OPERATE
Permit No. CB-ROP 05-01
In accordance with the provisions of Title V of the Clean Air Act and 40 C.F.R. Part 71 and applicable
rules and regulations,
Desert View Power, LLC
is authorized to operate air emission units listed herein and to conduct other air pollutant emitting activities in accordance with the permit conditions listed in this permit. Terms and conditions not otherwise defined in this permit have the meaning assigned to them in the referenced regulations. All
terms and conditions of the permit are enforceable by EPA and citizens under the Clean Air Act. If all proposed control measures and/or equipment are not installed and properly operated and maintained,
this will be considered a violation of the permit.
This permit is valid for a period of five (5) years and shall expire after 11:59:59 p.m. on the date five
years after the date of issuance unless a timely and complete renewal application has been submitted at
least 6 months but not more than 18 months prior to the date of expiration. The permit number cited
above should be referenced in future correspondence regarding this facility.

_____
Elizabeth J. Adams
Director, Air and Radiation Division
EPA Region IX
2

Abbreviations and Acronyms
AFS AIRS Facility Subsystem
ARB Air Resources Board
BTU British thermal units
CAPCOA California Air Pollution Control Officers Association
CEMS continuous emissions monitoring system
CFR Code of Federal Regulations
CO carbon monoxide
CO_2 carbon dioxide
COMS continuous opacity monitoring system
CMS continuous monitoring system
E_{ho} hourly SO_2 emission rate
EPA U.S. Environmental Protection Agency
Es sulfur dioxide emission rate
EU emissions unit
gr/dscf grains per dry standard cubic feet
H_2SO_4 sulfuric acid
HC hydrocarbon
HCl hydrochloric acid or hydrogen chloride

HP horsepower
hr hour
Hz hertz
J joule
kW kilowatt
lb pound
MMBtu million British thermal units
MWh megawatt-hour
ng nanograms
NO nitrogen oxide or nitric oxide
NO_2 nitrogen dioxide
NO_x nitrogen oxides
NSPS New Source Performance Standards
NSR New Source Review
O_2 oxygen
pA pico amps
PM particulate matter
PM_{10} particulate matter less than 10 microns in diameter
ppm parts per million
%Ps percent of sulfur dioxide emission rate
PSD Prevention of Significant Deterioration
SCAQMD South Coast Air Quality Management District
SO_2 sulfur dioxide
TDF tire-derived fuel
tpy tons per year
VMT vehicle miles traveled
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I. Source Identification
I.A. General Information
Parent Company name: Desert View Power, LLC
Parent Company Mailing Address: 62-300 Gene Welmas Drive
City: Mecca State: CA Zip: 92254
Plant Name: Desert View Power
Plant Location: 62-300 Gene Welmas Drive
City: Mecca State: CA
County: Riverside
EPA Region: 9
Reservation: Cabazon Reservation Tribe: Cabazon Band of Mission Indians
Company Contact: Jim Robertson Phone: (760) 262-1682
email: jrobertson@desertviewpower.com
Plant Manager/Contact: same Phone: same
Responsible Official: Greg Cook Phone: 916-596-2501
SIC Code: 4911
AFS Plant Identification Number: 06-065-00027
Description of Process: Biomass-fired power plant

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I.B. Emission-Generating Units and Activities

Emission Unit I.D. No.	**Unit Description**	**Associated Control Equipment Control Equipment I.D. No.**
EU-01	Boilers 1 & 2 Combustion Engineering Circulating Fluidized Bed Boilers, 300 million Btu/hr each, Siemens ABB VAX Turbine Generator, Total Net Electrical Output: 47 MW	Thermal de-NO_x system 01-C01 Fabric Filter/Baghouse 01-C02 Hydrated Lime/Dry Sorbent Injection System 01-C03
EU-03	Biomass fuel yard – wind erosion	Wind screens 03-C01
EU-04	Fuel hog and cyclone Enclosure, Fabric Filter/Baghouse	04-C01
EU-05	Fuel stacker	Enclosure 05-C01
EU-06	Petroleum coke storage	Partial enclosed building 06-C01
EU-07	Fly Ash Storage Silo	Fabric Filter/Baghouse 07-C01
EU-08	Cooling tower	Drift controls 08-C01
EU-09	Emergency generator, Generac Model 32868-12688, 275 kW, 60 Hz, 440 HP	n/a
EU-10	Fire pump, Cummins Model NT 855 F3, 290 HP	n/a
EU-11	Hydrated Lime Storage Silo	Fabric Filter 11-C01
EU-13	Hydrated Lime Truck Traffic	n/a
EU-14	Wood chips conveyor system	Partial covers and water sprays 14-C01

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II. Requirements for Specific Pollutants

II.A. Emission Limits

SO_2 Limits

1. The Permittee shall not discharge or cause the discharge into the atmosphere SO_2 in excess of the more stringent of 12.0 lbs/hr per boiler or 27 ppm, dry, corrected to 3% O_2 (3-hour average). In addition, the Permittee shall not discharge or cause the discharge into the atmosphere SO_2 in excess of a rolling average of 70 tons/year calculated daily. [PSD permit SE 87-01 Condition IX.E]

2. The Permittee shall not cause to be discharged into the atmosphere from the boilers comprising EU-01 when fired on petroleum coke any gases that contain sulfur dioxide in excess of 10 percent (0.10) of the potential sulfur dioxide emission rate (90 percent reduction) and that contain sulfur dioxide in excess of 520 ng/J (or 1.2 lb/MMBtu).
Only the heat input (in J or MMBtu) supplied to the affected facility from the combustion of petroleum coke is counted under this section. No credit is provided for the heat input to the boilers from the combustion of natural gas, wood, municipal-type solid waste, or other fuels or heat input to the boilers from exhaust gases from another source, such as gas turbines, internal combustion engines, kilns, etc. [40 CFR 60.42b(a)]

3. Compliance with the emission limit and/or percent reduction requirement under Condition II.A.2 of this permit must be determined on a 30-day rolling average basis.
[40 CFR 60.42b(e)]

Particulate Matter Limits

4. The Permittee shall not discharge or cause the discharge of PM_{10} in excess of the more stringent of 0.006 gr/dscf at 12% CO_2 or 3.9 lbs/hr per boiler (3-hour average) Compliance with this limit shall be demonstrated pursuant to Condition II.C.2 of this permit. [PSD permit SE 87-01 Condition IX.F]

5. The Permittee shall not cause to be discharged into the atmosphere from the boilers comprising EU-01 when fired on petroleum coke (alone or with other fuels) or wood (alone or with other fuels) any gases that contain particulate matter in excess of 43 ng/J (or 0.10 lb/MMBtu) heat input.
[40 CFR 60.43b(a) and (c)]

6. For each boiler comprising EU-01, the Permittee shall not discharge or cause the discharge of filterable PM in excess of 0.11 lb/MMBtu of heat input.
a. In the alternative, the Permittee may elect to comply with an output-based emission limitation for EU-01. In this case, for each boiler comprising EU-01, the Permittee shall not discharge or cause the discharge of filterable PM in excess of 0.14 lb/MMBtu of steam output (1.6 lb/megawatt-hour (MWh)). The Permittee should indicate whether it has elected to comply with this alternative emission limitation in reporting compliance with the limitation under Condition III.C.

[40 CFR 63.7500(a)(1); 40 CFR Part 63, Subpart DDDDD, Table 2, Item 9]
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Opacity Limits
7. The Permittee shall not discharge or cause the discharge into the atmosphere from the boiler exhaust stack gases which exhibit an opacity of 10 percent or greater for any period or periods aggregating more than three minutes in any one hour [PSD permit SE 87-01 Condition IX.F]
8. For each boiler, the Permittee shall maintain opacity to less than or equal to 10 percent opacity or
the highest hourly average (daily block average) opacity reading measured during the performance
test run demonstrating compliance with Condition II.A.6. [40 CFR 63.7500; (40 CFR Part 63, Subpart DDDDD, Table 4, Item 3)]
9. The Permittee shall not cause to be discharged into the atmosphere from the boilers comprising
EU-01 when fired on petroleum coke any gases that exhibit greater than 20 percent opacity (6-minute average), except for one 6-minute period per hour of not more than 27 percent opacity. [40
CFR 60.43b(f)]
CO Limits
10. The Permittee shall not discharge or cause the discharge of CO in excess of the more stringent of
13.0 lbs/hr per boiler or 231 ppm, dry, corrected to 3% O_2 (3-hour average). [PSD permit SE 87-01 Condition IX.G]
11. For each boiler comprising EU-01, the Permittee shall not discharge or cause the discharge of CO
in excess of 310 ppm by volume on a dry basis corrected to 3 percent oxygen, 30-day rolling average. Compliance with this limit shall be demonstrated by use of the Permittee's existing CO CEMS operated pursuant to Condition II.C.10.
a. In the alternative, the Permittee may elect to comply with an output-based emission limitation for EU-01. In this case, for each boiler comprising EU-01, the Permittee shall not discharge or cause the discharge of CO in excess of 4.6E-01 lb/MMBtu of steam output (5.2 lb/MWh) based on a 3-run average. Compliance with this limit shall be demonstrated by a use of the Permittee's existing CO CEMS operated pursuant to Condition II.C.10. The Permittee should indicate whether it has elected to comply with this alternative emission limitation in reporting compliance with the limitation under Condition III.C.
[40 CFR 63.7500(a)(1); 40 CFR Part 63, Subpart DDDDD, Table 2, Item 9]
NO_x Limits
12. The Permittee shall not discharge or cause the discharge into the atmosphere NO_x in excess of the
more stringent of 30.0 lbs/hr per boiler or 94 ppm, dry, corrected to 3% O_2 (3-hour average). In addition, the Permittee shall not discharge or cause the discharge of NO_x in excess of 648 lbs/day per boiler for any calendar day. [PSD permit SE 87-01 Condition IX.H]
13. The Permittee shall not cause to be discharged into the atmosphere from the boilers comprising

EU-01 any gases that contain NO_x (expressed as NO_2) in excess of the following limits [40 CFR 60.44b(a), (b), (c) and (d)]:

Fuel(s) Used NO_x Emission Limit

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Natural gas only 43 ng/J (or 0.10 lb/MMBtu) heat input
Petroleum coke only 260 ng/J (or 0.60 lb/MMBtu) heat input
Petroleum coke and other fuel(s) NO_x limit determined by the formula listed below
Wood and natural gas 130 ng/J (0.30 lb/MMBtu) heat input

When petroleum coke is burned along with another fuel or with a combination of fuels, the following formula shall be used to determine the required emission limit [40 CFR 60.44b(b) and 60.44b(c)]:

$E_n = [(EL_g \times H_g) + (EL_c \times H_c)] / (H_g + H_c)$

where:

E_n is the nitrogen oxides emission limit (expressed as NO_2), in units of ng/J or lb/MMBtu
EL_g is the NO_x emission limit from the above table in this permit condition for combustion of natural gas
H_g is the heat input from combustion of natural gas
EL_c is the NO_x emission limit from the above table in this permit condition for combustion of petroleum coke
H_c is the heat input from combustion of petroleum coke

14. Compliance with the nitrogen oxide emission limits in Condition II.A.13 of this permit shall be determined on a 30-day rolling average basis. A new rolling average emission rate is calculated for each steam generating unit operating day as the average of all of the hourly NOx emission data for the preceding 30 steam generating unit operating days. [40 CFR 60.44b(i), 40 CFR 60.46b(c), 40 CFR 60.46b(e)(2) and (3)]

Hydrocarbon Limit

15. The Permittee shall not discharge or cause the discharge of hydrocarbons in excess of 5.9 lbs/hr per boiler (3-hour average). [PSD permit SE 87-01 Condition IX.I]

Hydrogen Chloride Limit

16. For each boiler comprising EU-01, the Permittee shall not discharge or cause the discharge of hydrogen chloride in excess of 0.022 lb per MMBtu of heat input. [40 CFR Part 63, Subpart DDDDD, Table 2]

Mercury Limit

17. For each boiler comprising EU-01, the Permittee shall not discharge or cause the discharge of mercury in excess of 5.7E-06 lb per MMBtu of heat input. [40 CFR Part 63, Subpart DDDDD, Table 2]

Startup, Shutdown and Malfunction Provisions

18. Startup, shutdown and malfunction conditions:

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a. The concentration limits (ppm) in Conditions II.A.1, II.A.10 and II.A.12 of this permit apply at all times except during conditions of startup, shutdown and malfunction of the

plant boilers. [PSD permit SE 87-01 Condition IX.M]
b. The emission limits and percent reduction requirements in Conditions II.A.2 and II.A.13 apply at all times including periods of startup, shutdown and malfunction. [40 CFR 60.42b(g), 40 CFR 60.45b(a), 40 CFR 60.44b(h), 40 CFR 60.46b(a)]
c. The emission and opacity limits in Conditions II.A.5 and II.A.9, apply at all times except during conditions of startup, shutdown and malfunction. [40 CFR 60.43b(g), 40 CFR 60.46b(a)]
d. For conditions derived from the PSD permit, startup is defined as the period of time during which the boiler is heated to operating temperature at a steady state load from a lower temperature, not to exceed 36 hours. If curing of refractory is required after repair or modifications, startup time shall not exceed 60 hours. Operating temperature indicating steady state load shall be indicated by the temperature at the outlet of the recycle cyclone reaching 1550 degrees Fahrenheit for a period of at least 5 minutes. [PSD permit SE 87-01 Condition IX.M]
e. For conditions derived from the PSD permit, shutdown is defined as the period of time, not to exceed 8 hours, during which the boiler is allowed to cool from its operating temperature at steady-state load to a lower temperature. [PSD permit SE 87-01 Condition IX.M]
f. The emission limits in Conditions II.A.6, II.A.13, II.A.15, and II.A.16 apply at all times, except for periods of startup and shutdown when the following conditions apply:
i. For startup:
1. The Permittee must operate all continuous monitoring systems.
2. If using Definition (1) of "startup" in §63.7575, the Permittee must use one or a combination of clean fuels vent emissions to the main stack and operate all applicable control devices, except the fabric filter/baghouse, and the dry sorbent and limestone injection system. The Permittee must start the dry sorbent and limestone injection system as expeditiously as possible. Startup ends when steam or heat is supplied for any purpose.
3. If using Definition (2) of "startup" in §63.7575, once the Permittee begins to fire fuels other than clean fuels, the Permittee must vent emissions to the main stack(s) and engage all of the applicable control devices so as to comply with the emission limits within 4 hours of start of supplying useful thermal energy. The Permittee must engage and operate PM control within one hour of first feeding fuels that are not clean fuels or when necessary to comply with other applicable standards that require operation of the control devices. The Permittee must develop and implement a written startup and shutdown plan, as specified in §63.7505(e).
ii. For shutdown:
1. The Permittee must operate all continuous monitoring systems
10
2. When firing fuels other than clean fuels, the Permittee must vent emissions to the main stack and operate all applicable control devices, except the fabric filter/baghouse, and the dry sorbent and limestone injection system, unless it is necessary to comply with other applicable

requirements that require operation of the control device.
3. If in addition to the fuel used prior to initiation of shutdown, another fuel must be used to support the shutdown process, that additional fuel must be one or a combination of clean fuels.
iii. For startup and shutdown:
1. The Permittee must collect monitoring data, as specified in 40 CFR 63.7535(b).
2. The Permittee must keep records.
3. The Permittee must provide reports concerning activities and periods of startup and shutdown, as specified in 40 CFR 63.7555.
For the purposes of this condition, "startup" means:
Definition (1): The first-ever firing of fuel in a boiler or process heater for the purpose of supplying useful thermal energy for heating and/or producing electricity, or for any other purpose, or the firing of fuel in a boiler after a shutdown event for any purpose. Startup ends when any of the useful thermal energy from the boiler or process heater is supplied for heating, and/or producing electricity, or for any other purpose, or
Definition (2): The period in which operation of a boiler or process heater is initiated for any purpose. Startup begins with either the first-ever firing of fuel in a boiler or process heater for the purpose of supplying useful thermal energy (such as steam or heat) for heating, cooling or process purposes, or producing electricity, or the firing of fuel in a boiler or process heater for any purpose after a shutdown event. Startup ends four hours after when the boiler or process heater supplies useful thermal energy (such as heat or steam) for heating, cooling, or process purposes, or generates electricity, whichever is earlier.
For the purposes of this condition, "shutdown" means the period in which cessation of operation of a boiler is initiated for any purpose. Shutdown begins when the boiler no longer supplies useful thermal energy (such as heat or steam) for heating, cooling, or process purposes and/or generates electricity or when no fuel is being fed to the boiler, whichever is earlier. Shutdown ends when the boiler no longer supplies useful thermal energy (such as steam or heat) for heating, cooling, or process purposes and/or generates electricity, and no fuel is being combusted in the boiler.
For the purposes of this condition, "clean fuels" means natural gas, synthetic natural gas, propane, other Gas 1 fuels, distillate oil, syngas, ultra-low sulfur diesel, fuel oil-soaked rags, kerosene, hydrogen, paper, cardboard, refinery gas, liquefied petroleum gas, clean dry biomass, and any fuels meeting the appropriate HCl, mercury and TSM emission standards by fuel analysis.
[40 CFR 63.7575; 40 CFR 63 Part 63, Subpart DDDDD, Table 3, Items 5 and 6,]
19. When determining compliance with conditions derived from the NSPS (i.e., 40 CFR part 60), the
following definitions apply [40 CFR 60.2]:
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a. "Affected facility" means, with reference to a stationary source, any apparatus to which a standard is applicable.
b. "Malfunction" means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or

usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.
c. "Startup" means the setting in operation of an affected facility for any purpose.
d. "Shutdown" means the cessation of operation of an affected facility for any purpose.

II.B. Work Practice and Operational Requirements

1. The Permittee shall install, continuously operate and maintain the following air pollution controls to minimize emissions. Controls listed shall be fully operational upon startup of the proposed equipment. [PSD permit SE 87-01 Conditions IX.B.1 through 8]
a. Each boiler will exhaust to a fabric filter, using PTFE or teflon-laminated bags, for the control of particulate emissions.
b. Each boiler shall be equipped with a limestone injection and hydrated lime system for the control of SO_2, acid gas emissions (H_2SO_4 and HCl).
c. Each boiler shall be equipped with an ammonia injection system for the control of NO_x emissions.
d. The onsite fuel hog shall be wind enclosed for the control of particulate emissions.
e. The ash handling system shall be completely enclosed, and the ash storage silo equipped with a fabric filter, for the control of particulate emissions.
f. The cooling towers shall have drift controls installed to limit drift losses to 0.001 percent of the circulating water mass for the control of particulate emissions.
g. The Permittee shall install an enclosed petroleum coke storage facility; no open storage of petroleum coke shall be allowed.
2. Only natural gas, propane, or other such gas may be fired by the auxiliary burners. [PSD permit SE 87-01 Condition IX.D.1]
3. Treated wood or wood wastes, coal or coal byproducts and municipal solid waste other than wood waste, railroad ties, tire-derived fuel (TDF), and corrugated paper waste, shall not be used as a fuel by this facility. [PSD permit SE 87-01 Condition IX.D.2]
4. When wind speeds exceed 12 mph, the Permittee shall control particulate emissions from the fuel storage pile and from the ash storage pile through the use of regular watering. [PSD permit SE 87-01 Condition IX.D.5]
5. The Permittee shall meet the following requirements for the emergency generator (EU-9) and fire pump (EU-10):
a. Operation of the emergency generator (EU-09) and fire pump (EU-10) shall not exceed 200 hours per calendar year each nor use more than 22 gallons of diesel per hour per unit. [PSD permit SE 87-01 Condition IX.D.6]
b. For the engine to be considered an emergency engine pursuant to applicable provisions of 40 CFR part 63, subpart ZZZZ, the Permittee must operate EU-09 and EU-10 as follows:
(i) Operate EU-09 and EU-10 for any combination of the purposes specified in 40

CFR 63.6640(f)(2)(i) through (iii) for a maximum of 100 hours per calendar year each. Any operation for non-emergency situations as allowed by 40 CFR 63.6640(f)(3) counts as part of allowed 100 hours per calendar year. [40 CFR 63.6640(f)(2)]
(ii) EU-09 and EU-10 may be operated for up to 50 hours per calendar year in nonemergency situations. The 50 hours of operation in non-emergency situations are counted as part of the 100 hours allowed by Condition No. II.B.5.b.ii. The 50 hours per year for non-emergency situations cannot be used for peak shaving or nonemergency demand response, or to generate income for a facility to supply power to an electric grid or otherwise supply power as part of a financial arrangement with another entity. [40 CFR 63.6640(f)(3)]
c. Change oil and filter every 500 hours of operation or annually, whichever comes first. As an alternative, the Permittee may change the oil consistent with the oil analysis program at 40 CFR 63.6625(i) [Table 2c, Item 1 to 40 CFR Part 63, Subpart ZZZZ];
d. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary [Table 2c, Item 1 to 40 CFR Part 63, Subpart ZZZZ];
e. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary [Table 2c, Item 1 to 40 CFR Part 63, Subpart ZZZZ];
f. During periods of startup, the Permittee must minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply [Table 2c, Item 1 to 40 CFR Part 63, Subpart ZZZZ];
g. Operate and maintain each engine according to the manufacturer's emission-related operation and maintenance instructions; or develop and follow your own maintenance plan which must provide to the extent practicable for the maintenance and operation of the engine in a manner consistent with good air pollution control practice for minimizing emissions [Table 6, Item 9 to 40 CFR Part 63, Subpart ZZZZ];
f. In order for the engine to be considered an emergency engine, the Permittee must operate the engine according to 40 CFR 63.6640(f)(1-3).
[40 CFR 63.6602; 40 CFR 63.6625(i); 40 CFR 63.6640(a); 40 CFR 63.6640(f); Table 2c, Item 1 to 40 CFR Part 63, Subpart ZZZZ; Table 6, Item 9 to 40 CFR Part 63, Subpart ZZZZ].
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7. The Permittee shall comply at all times with the requirements of South Coast Air Quality Management District (SCAQMD) Rule 403 - Fugitive Dust - as required by the Monitoring & Enforcement Agreement (see Attachment A) to which the Permittee is a signatory. In addition, the Permittee shall comply with the following measures in order to minimize fugitive emissions from the ash storage pile [PSD permit SE 87-01 Condition IX.D.7]:
a. The total amount of ash stored at any one time shall not exceed 13,500 tons.
b. Prior to transfer from the silo to the storage area, ash shall be conditioned with water to prevent dust generation during filling of the transfer truck, movement to the storage area, and placement in storage.
c. The ash storage pile shall not exceed 15 feet in height.
d. During reclamation from storage for transport, offsite or otherwise, any disturbed ash shall be sprayed with water to prevent dust generation.
e. Prior to movement offsite, transfer trucks shall be water washed, if necessary, to remove

loose ash. Exposed ash on any ash transfer truck shall be either wetted or fully covered with a tarp to prevent dust generation during transport.
8. The Permittee shall utilize quarterly a minimum of fifty percent (50%) biomass materials (by weight) as feedstock in its solids fuel supply for the Facility. In any event, the Permittee shall utilize fuel mix rates which allow the plant to continually meet all EPA and SCAQMD emission standards applicable to the Permittee pursuant to the Monitoring and Enforcement Agreement. [PSD permit SE 87-01 Condition IX.D.9]
9. Except as specified in Condition II.C.4 of this permit, the Permittee shall utilize in any twoconsecutive
calendar-year periods a minimum annual average of 60,000 bone-dry tons of a combination of agricultural crop residue waste and woody waste generated from sources in Riverside County located within the Coachella Valley. [PSD permit SE 87-01 Condition IX.D.10]
10. The boilers comprising EU-01 may combust natural gas to satisfy the sulfur dioxide emission limit
in Condition II.A.3 of this permit when the sulfur dioxide control system is not being operated because of malfunction or maintenance of the sulfur dioxide control system. [40 CFR 60.42b(i)]
11. The Permittee shall not utilize on an hourly basis more than twenty percent (20%) each railroad
ties, TDF, and corrugated paper waste calculated on an energy basis. In addition, the Permittee shall not utilize on an annual basis more than 15% each railroad ties, TDF, and corrugated paper waste calculated on an energy basis. [PSD permit SE 87-01 Condition IX.D.11]
12. The Permittee must have a one-time energy assessment performed by a qualified energy assessor
pursuant to the requirements of 40 CFR Part 63, Subpart DDDDD, Table 3. [40 CFR 63.7510(e)]
13. The Permittee must conduct a tune-up of the boilers every five years pursuant to the requirements
of 40 CFR Part 63, Subpart DDDDD, Table 3. [40 CFR 63.7540(a)(12)]
14. The Permittee must establish a minimum dry sorbent injection rate as defined in 40 CFR 63.7575
and develop an operating limit pursuant to Table 7, Item 2b requirements. The monitoring system
for the dry sorbent injection rate must meet the requirements in 40 CFR 63.7525(i)(1) and (2). [40
CFR 63.7525(i)]
14
a. In the alternative, the Permittee may establish an alternative site-specific maximum SO_2 emission rate according to §63.7530(b) and operate an SO_2 CEMS pursuant to 40 CFR 63.7525(m).
b. In the alternative, the Permittee may install, operate and maintain an HCl CEMS pursuant to 40 CFR 63.7540(a)(15).
c. The Permittee is instructed to comply with applicable requirements for preconstruction review pursuant to 40 CFR part 49.151-167 for any new equipment installation.
[40 CFR Part 63, Subpart DDDDD, Tables 4 and 7; 40 CFR 63.7500(a); 40 CFR 63.7525(l)(2), 40

CFR 63.7525(l)(8); 40 CFR 63.7525(m); 40 CFR 63.7530(b); 40 CFR part 49.151-167]
15. To comply with emission and operating requirements for mercury, the Permittee must either install, operate and maintain a Mercury CEMS according to 40 CFR 63.7540(a)(14); or
a. In the alternative, the Permittee may establish and maintain a minimum carbon injection rate as defined in 40 CFR 63.7575 and develop an operating limit pursuant to Table 7, Item 3 requirements.
b. The Permittee is instructed to comply with applicable requirements for preconstruction review pursuant to 40 CFR part 49.151–167 for any new equipment installation.
[40 CFR Part 63, Subpart DDDDD, Tables 4 and 7; 40 CFR 63.7500(a); 40 CFR 63.7530(b), 40 CFR 63.7540(a)(14), 40 CFR 63.7525(l)(2); 40 CFR 63.7525(l)(8); 40 CFR part 49.151-167]
16. The Permittee must comply with the fuel analysis requirements for emissions of HCl and Mercury
pursuant to 40 CFR Part 63, Subpart DDDDD, Table 6 if not operating a Mercury CEMS for compliance with Mercury limits or an HCl or SO_2 CEMS for compliance with HCl limits. [40 CFR 63.7521; 40 CFR 63.7525(l)(8)]
17. Additional requirements for Hydrated Lime Delivery System Pursuant to 40 CFR 49.153(a)(2)
Minor NSR in Indian Country [PSD permit SE 87-01 Condition XI]

Emission Unit
Description

EU-11
Hydrated Lime Storage Silo
(with fabric filter)

EU-13
Hydrated Lime Truck Traffic

a. Emissions Limitations and Work Practice Standards
i. Vehicle miles traveled (VMT) for truck traffic associated with deliveries of hydrated lime (EU-13) to the permitted source shall not exceed 280 miles per 12-month period.
ii. Annual delivery and usage of hydrated lime shall not exceed 2365 tons per 12-month period.
15
b. Monitoring and Testing Requirements
i. The Permittee shall monitor on a monthly basis each delivery of hydrated lime (in tons) and the VMT for each delivery.
ii. At least once per calendar month, the Permittee shall inspect the interior and exterior of the fabric filters of EU-11 for evidence of damage or leaks and take appropriate corrective actions to restore filters to proper operation before resuming normal operations.
c. Recordkeeping and Reporting Requirements
i. The Permittee shall maintain records on a monthly basis of each delivery related to hydrated lime, including the tons of hydrated lime delivered and VMT for each delivery, and determine the 12-month rolling total for each.
ii. The Permittee shall maintain records of the dates and results of each filter inspection performed pursuant to Condition II.B.17.b.ii and any corrective actions

taken as a result of the required inspections shall be recorded.
16

II.C. Monitoring and Testing Requirements

1. Annually, and at such other times as specified by EPA, the Permittee shall conduct performance tests for NO_x, SO_2, PM, PM_{10}, CO, hydrocarbon, HCl, and mercury emissions from the boilers comprising EU-01 and furnish EPA a written report of the results of such tests. The tests for NO_x, SO_2, PM_{10} and CO shall be conducted at the maximum operating capacity of the facility being tested. Upon written request (Attn: Air Section, ENF-2-1) from the Permittee, EPA may approve the conducting of performance tests at a lower specified production rate. After initial performance tests and upon written request and adequate justification from the Permittee, EPA may waive a specified annual test for the biomass-fired facility. Annual performance tests for PM, HCl, and mercury must be completed no more than 13 months after the previous test, except as specified in 40 CFR 63.7515(b), (c) and (g). [PSD permit SE 87-01 Condition IX.C.1, 40 CFR 71.6(c), 40 CFR 63.7515(a)]

2. Performance tests for the emissions of NO_x, SO_2, PM, PM_{10}, CO, hydrocarbons, HCl, and mercury as required by Condition II.C.1 of this permit shall be conducted and the results reported in accordance with Condition II.E.6 [PSD permit SE 87-01 Condition IX.C.2, 40 CFR 71.6(c)]:

a. Performance tests for the emissions of SO_2 shall be conducted using EPA Test Methods 1-4 and 8.

b. Performance tests for the emissions of PM shall be conducted using EPA Test Methods 1-4 (for general source test requirements; Method 5 or 17 (positive pressure fabric filters must use Method 5D), and Method 19 (for F-factor methodology). [40 CFR Part 63, Subpart DDDDD, Table 5]

c. Performance tests for the emissions of PM_{10} shall be conducted using EPA Test Methods 1-4 and Method 5 and 201A.

d. Performance tests for the emissions of CO shall be conducted using EPA Test Methods 1-4 and 10.

e. Performance tests for the emissions of NO_x shall be conducted using EPA Test Methods 1-4 and 7.

f. Performance tests for the emissions of HCl shall be conducted using EPA Test Methods 1-4 (for general source test requirements); Method 26 or 26A (to measure HCl concentration); and Method 19 (for F-factor methodology). [40 CFR Part 63, Subpart DDDDD, Table 5]

g. Performance tests for the emissions of Mercury shall be conducted using EPA Test Methods 1-4 (for general source test requirements); Methods 29, 30A, 30B, Method 101A, or ASTM Method D6784 (to measure mercury concentration); and Method 19 (for F-factor methodology). [40 CFR Part 63, Subpart DDDDD, Table 5]

3. The EPA (Attn: Air Section, ENF-2-1) shall be notified in writing at least 60 days prior to the tests described in Condition II.C.2 of this permit to allow time for the development of an approvable

performance test plan and to arrange for an observer to be present at the test. Such prior approval shall minimize the possibility of EPA rejection of test results for procedural deficiencies. In lieu of

APPENDIX E
SITE SAFETY PLAN

MONTROSE
ENVIRONMENTAL

Site Safety Plan Booklet

Finalized: April, 2018

Introduction

Employee safety is the top priority of Montrose Environmental Group. All employees must be trained to mitigate the hazards faced each day. The site manager and project manager/lead are responsible to ensure all hazards have been proper identified and managed. All employees have Stop Work Authority in all situations where an employee feels they cannot perform a job safely or a task for which they have not been adequately trained.

The Site Safety Plan (SSP) has been developed to help assist Montrose test crews with identifying physical and health hazards that could harm our employees and determining how the hazards will be managed. Additionally, the SSP will help each crew manage the health of the employees by providing emergency procedures and information.

The booklet contains all the different safety forms that you may need in the field into one document. The SSP consists of the following:

1. A standardized, two-page, fillable pdf, form that is used as the Hazard Analysis and Safety Plan
2. Hazard Control Matrix - contains useful information on both engineering and administrative controls that a crew can use to reduce or eliminate the hazards they have observed plus applicable PPE that may be required
3. Tool Box Meeting Record – Keeps a daily record of the scheduled testing for the day and a short refresher of the hazards that were identified in the test location SSP and any hazard controls/PPE
4. Additional Forms
    a. Aerial Lift Inspection Form
    b. Heat Stress Prevention Form
    c. Extended Hours Form
    d. Safe Work Permit

An SSP for each location must be completed or at least started prior to mobilization and included as part of your Project Test Plan. Each test crew will then assess the hazards again while on-site looking for changes or new hazards. Once an SSP is completed, it will need to be reviewed before set up at each of your client's testing locations. Any day a SSP is not reviewed, a Tool Box Meeting will need to be completed.

The SSP is a living document. Each test crew should update the plan as new hazards are found. The client project manager should continually update their SSPs as new information and conditions result in new or changed hazards. The goal is to provide each crew with the most up-to-date hazard and safety information

MAQS Site Safety Plan

Client	Desert View Power	Contact Name	Kevin Lawrence	Date	01/20/21
Location	Mecca, CA	SSP Writer	Dave Wonderly	PM	

Job Preparation

☐ Job Site Walk Through Completed ☐ Site Specific Training Complete ☐ Certified First Aid Person _____
☐ Site Walk Through Needed ☐ Site Specific Training Needed ☐ Other:

Facility Information/Emergency Preparedness

Plant Emergency # (760) 396-2554
On-Site EMS ☐ Yes ☒ No
EMS Location _____
Nearest Urgent Care Facility: _____

Identify and Locate the following:
Evacuation Routes to main gate
Severe Weather Shelter Source test trailer
Rally Point Main Gate
Location of Eye Wash/Safety Shower:

Source Information: (list type)

Flue Gas Temp. (°F) 350 Flue Gas Press. ("H_2O) 0.1 Flue Gas Components NOx, SO2, HCL, NH3
Flue Gas Inhalation Potential? ☒ Yes ☐ No
Describe Hazard Protection Plan: Keep ports closed and or covered, use a acid gas resperator as needed.

Required PPE ☒ Hard Hats ☒ Safety Glasses ☒ Steel Toed Boots ☒ Hearing Protection

Additional PPE Requirements

☐ Hi-Vis Vests ☐ Harness/Lanyard* ☐ Goggles ☐ Personal Monitor Type: _____
☐ Metatarsal Guards ☐ SRL(s) ☐ Face Shield ☐ Respirator Type: acid gases
☐ Nomex/FRC ☐ Hot Gloves ☐ 4-Gas Monitor ☐ Other PPE:

Critical Procedures – check all that apply – "*" indicates additional form must be completed

☐ Hot Weather Work* ☐ Confined Space* ☐ Aerial Work Platform* ☐ Roof Work ☐ Scaffold
☐ Cold Weather Work ☐ Lock out/Tag Out ☐ Exposure Monitoring ☐ Other:

Working at Heights Management

Fall Protection Plan ☒ Fixed Guardrails/Toeboards ☐ Fall Protection PPE ☐ Warning Line
Describe Hazard Protection Plan: Large well protected platform 20" above grade.

Falling Objects Protection Plan

☐ Barricading ☐ Netting ☒ House Keeping ☐ Tethered Tools ☐ Catch Blanket or Tarp ☐ Safety Spotter
Describe Hazard Protection Plan:

MAQS Site Safety Plan

Fall Hazard Communication Plan

☐ Adjacent/Overhead Work ☐ Contractor Contact ☐ Client Contact

Describe Communication Plan:

Environmental Hazards - Weather Forecast

☐ Heat/Cold ☐ Lightning ☐ Rain ☐ Snow ☐ Ice ☐ Tornado ☐ Wind Speed _____

Describe Hazard Protection Plan:

Additional Work Place Hazards

Physical Hazards	**Hazard Controls**
☐ Nuisance Dust Hazards	☐ Dust Mask ☐ Goggles ☐ Other:
☐ Thermal Burn	☐ Hot Gloves ☐ Heat Shields ☐ Other Protective Clothing:
☐ Electrical Hazards	☐ Connections Protected from Elements ☐ External GFCI ☐ Other:
☐ Inadequate Lighting	☐ Install Temporary Lighting ☐ Headlamps
☐ Slip and Trip	☐ Housekeeping ☐ Barricade Area ☐ Other:

Describe Hazard Protection Plan:

List of Hazardous Chemicals

				Other Chemicals:
☑ Acetone	☐ Nitric Acid	☑ Hydrogen Peroxide	Compressed Gases	☐
☐ Hexane	☐ Sulfuric Acid	☑ Isopropyl Alcohol	☐ Flammable Gas	☐
☐ Toluene	☐ Hydrochloric Acid	☐ Liquid Nitrogen	☑ Non-Flammable Gas	☐

Describe Hazard Protection Plan: Use of glovers when handling liquid reagents.

Wildlife/Fauna

Describe Hazard Protection Plan:

Crew Names & Signatures

Print Name	Signature	Date	Print Name	Signature	Date

Job Site Hazard Mitigation Plan

Hazard	Description	Engineering Controls	Administrative Controls	PPE
Ergonomic: Strains/Sprains	The manual movement of equipment to testing location can cause strains	• Eliminate manual "lifts" and use elevators and/or cranes when possible. Stairs can also be used where feasible. • Use lifting straps and locking carabiners to eliminate the need to continuously tie and untie loads. • Use pulley system to eliminate improper ergonomics when lifting and facilitate sharing of loads • Winches should be evaluated and used as much as possible to assist • Equipment should be staged on table or other elevated platform to assist with rigging, lifting and prevent bending over when securing equipment to hoist. • Maintain radio contact between ground and platform to ensure the process is going smoothly or if a break is needed.	• Stretching prior to and after lifting and lowering tasks to keep muscles and joints loose • Break loads into smaller more manageable portions • 3 man lift teams during initial set up and tear down w/2 below and one above • Job rotation and/or breaks during initial set up and tear down. • Discuss potential hazard and controls during tailboard meetings • Observe others and comment on technique	• Gloves, appropriate to task
Falling objects	When working from heights there is a potential of falling objects from elevated work platform striking someone or something below	• Ensure job area is barricaded off with hazard cones, caution tape and/or appropriate warning signs. Specific measures should comply with local plant rules. • Ensure a spotter is present during a lift or lowering of equipment. • Catch blanket should be used on the platform to prevent objects from falling through any grating. • Magnetic trays should be used to hold flange bots and nuts. • Tools should be tethered to platform or personnel uniform.	• Review hazards with any adjacent workers & the client so they understand the scope and timing of the job • Follow proper housekeeping practices by keeping the test location neat and orderly, keeping trash in bags and non-essential equipment stored when not in use. • Perform periodic job site inspections to ensure housekeeping is being observed • Review "grab and twist" method of handling tools and equipment between employees	• Hardhat • Steel toed boots • Work clothes

Job Site Hazard Mitigation Plan

Hazard	Description	Engineering Controls	Administrative Controls	PPE
Fall	Fall hazard exists when working from above 4' with no guardrails	• Verify anchor point • Warning Line system	• Review Working from Heights procedure prior to job • Maintain 3 points of contact when climbing stairs or ladders • Ensure all fall protection equipment has been inspected and is in good working order	• Harness and Lanyard
Burn	Flue gas temperature can be elevated and that can lead to hot temperature testing equipment. Hot pipes or other duct work at plant.	• Use heat resistant refractory blanket insulation to seal port once probe is inserted. Use duct tape to further seal the outer flange area of the port. • Use heat resistant blankets to shield workers from hot sources	• Work in tandem with partner to immediately fill sample port with heat resistant refractory insulation • Stand up wind of port when opening. If stack pressure is greater than 2" H_2O, a face shield is required. • Allow appropriate time to handle probes • Notify all team members at the test location when a probe is removed from a hot source and communicate to all crew members to exercise caution handling or working near the probe	• High temp. gloves • Long gauntlets • Long sleeve shirts • FRC
Atmosphere	Air concentrations could be above PEL	• Probe are to be sealed to prevent stack gases from leaking out • Ventilation, open all doors and window to dilute concentrations in work area • Vent analyzer or meter outside	• Stand up wind of ports • Use a gas monitor to ensure levels of contaminants are below PEL	• Respirator • SAR
Hearing	Production areas of plants could be high	NA	• Set up equipment or trailer as far away as possible from noise producing plant equipment.	• Ear plugs • Ear muffs (check with plant contact on exposure levels)

Job Site Hazard Mitigation Plan

Hazard	Description	Engineering Controls	Administrative Controls	PPE
Fire	High flue gas temps, chemicals, electricity could cause fire	• Fire extinguisher at job location	• Observe proper housekeeping • If conducting hot work, review procedures and permitting with site contact	• N/A
Weather	Conditions may pose significant hazards	• Weather App warning	• Lightning policy • JHA review of weather daily • Plant severe weather warning systems	• Appropriate clothing for conditions
Hot Weather	Extreme hot temperatures can cause physical symptoms	• Shade • Reduce radiant heat from hot sources • Ventilation fans	• Frequent breaks • Additional water or electrolyte replenishment • Heat Stress Prevention Form • Communication with workers • Share work load	• Appropriate clothing for conditions • Sunscreen
Cold Weather	Extreme cold temperatures can cause physical symptoms	• Hand warmers • Heaters • Wind blocks	• Calculate wind chill • Frequent warm up periods • Communication with workers	• Appropriate clothing for conditions
AWP	Overhead and ground hazards pose dangers	• Ensure all fall protection equipment has been inspected and is in good working order • Barricade off area where AWP is in use	• AWP pre-use inspection can identify problems with equipment • Site walk through can identify overhead and ground hazards	• Hardhat • Steel toed boots • Safety glasses • Harness/lanyard • Gloves
Scaffold	Fall hazard	• Yellow tagged scaffold may require harness & lanyard • Inspect harness & lanyard prior to use • Barricades • Netting	• Scaffold inspection prior to use can identify if scaffold meets OSHA regulations • Current scaffold training	• Hardhat • Steel toed boots • Safety glasses • Harness/lanyard

Job Site Hazard Mitigation Plan

Hazard	Description	Engineering Controls	Administrative Controls	PPE
Chemicals	Chemical fumes or splashing can cause asphyxiation or burns	• Chemical containers stored properly • Ventilation • Properly labeled secondary containers	• Spill kit training • Lab SOP • Good housekeeping • Personal hygiene	• Safety glasses • Chemical gloves • Lab coat • Ventilation • Goggles/Face shield as needed

Daily Tool Box Meeting Record

Client: _____ **Job No.:** _____ **Location:** _____ **Date:** _____

Scope of Work: _____

_____

_____

Changes in Hazards Any significant change in Hazards, update Site Specific Plan and sign off.

Site Specific Plan review

☐ ***Emergency Preparation*** ____ Rally Point ____ Alternate Exits ____ Obstacles in Route

☐ ***Source*** ____ Stack Temp. ____ Static Pressure ____ Flue gas contaminants

☐ ***PPE***
____ Hard Hats ____ Safety Glasses ____ Steel Toed Boots ____ Hearing Protection
____ Hi-Vis Vests ____ Harness* ____ Goggles ____ Personal Monitor Type: _____
____ Metatarsals ____ SRL ____ Face Shield ____ Respirator Type: _____
____ Nomex/FRC ____ Hot Gloves ____ 4-Gas Monitor ____ Other PPE: _____

☐ ***Critical Procedures*** ____ Scaffold ____ Aerial Work Platform* ____ Confined Space*
____ LOTO ____ Roof Work ____ Exposure Monitoring

☐ ***Fall Protection*** ____ Guardrails ____ Fall Protection ____ Warning Lines

☐ ***Working at Heights*** ____ Barricading ____ Tethered Tools ____ Netting
____ Housekeeping ____ Catch Blanket ____ Other: _____

☐ ***Barricades***
____ Morning Inspection _____ Printed Name _____ Signature
____ EOBD Inspection _____ Printed Name _____ Signature

☐ ***Communication*** ____ Adjacent/Overhead Work ____ Contractor Contact ____ Client Contact

☐ ***Weather*** ____ Forecast ____ Lightning ____ Wind Speed ____ Wind Direction
____ Temperature ____ Cold ____ Hot*, *above 91° F use Heat Stress Prevention Form*
____ Fluids Reminder ____ Proper Clothing ____ Ice-Rain ____ Snowy

☐ ***Workplace Hazards*** ____ Dust ____ Electrical ____ Slips, Trips & Falls ____ Thermal Burn ____ Lighting

☐ ***Chemical*** ____ Labeling ____ PPE ____ Cylinders Secured
____ Storage ____ Ventilation ____ Sample Storage

☐ ***Surroundings*** ____ Site Traffic ____ Trucks ____ Forklifts
____ Construction ____ Cranes ____ Wildlife/Fauna
____ Machine Guarding ____ Chemical ____ Upwind/downwind Hazards

☐ ***Harness & Lanyard*** Inspected by:

_____ Printed Name _____ Signature

_____ Printed Name _____ Signature

_____ Printed Name _____ Signature

_____
Tool Box Meeting Leader Signature

Test Crew Initials:

_____ _____ _____
_____ _____ _____
_____ _____ _____
_____ _____ _____

Notes:

*Requires additional form.

001AS-Safety-FM-5

MONTROSE
AIR QUALITY SERVICES

Montrose Air Quality Services -Daily Aerial Lift Inspection Form

All checks must be completed before operation of the aerial lift. This checklist must be used at the beginning of each shift or after six to eight hours of use.

General Information (Check All That Apply)

Manually Propelled Lift: _____ **Self-Propelled Lift:** _____

Aerial Lift Model Number: _____ **Serial Number:** _____

Make: _____ **Rented Or Owned?** _____

Initial Description – Indicate by checking "Yes" that an item is adequate, operational, and safe. Check "No" to indicate that a repair or other corrective action is required prior to use. Check "N/A" to indicate "Not Applicable."

Number Item to be Inspected	Yes	No	N/A
A. Perform a visual inspection of all aerial lift components, i.e. missing parts, torn or loose hoses, hydraulic fluid leaks, etc. Replace as necessary	☐	☐	☐
B. Check the hydraulic fluid level with the platform fully lowered	☐	☐	☐
C. Check the tires for damage. Check wheel lug nuts for tightness	☐	☐	☐
D. Check the hoses and the cables for worn areas or or chafing.	☐	☐	☐
E. Check for cracked welds	☐	☐	☐
F. Check the platform rails and safety gate for damage	☐	☐	☐
G. Check for bent or broken structural members	☐	☐	☐
H. Check the pivot pins for security	☐	☐	☐
I. Check that all warning and instructional labels are legible and secure	☐	☐	☐
J. Inspect the platform control. Ensure the load capacity is clearly marked	☐	☐	☐

Initial Description – Continued

Number	Item to be Inspected	Yes	No	N/A
K.	Check for slippery conditions on the platform	☐	☐	☐
L.	Verify that the Manufacturer's Instruction Manual is present inside the bucket	☐	☐	☐
M.	Check the hydraulic system pressure (See manufacturer's specifications). If the pressure is low, determine the reason and repair in accordance with accepted procedures as outlined in the service manual	☐	☐	☐
N.	Check the base controls for proper operation. Check switches and push buttons for proper operation	☐	☐	☐
O.	Check the platform controls for proper operation. Check all switches and push buttons, as well as ensuring that the drive controller returns to neutral	☐	☐	☐
P.	Verify that a fire extinguisher is present, mounted, and fully charged and operational inside the bucket	☐	☐	☐
Q.	Verify that the aerial lift has headlights and a safety strobe-light installed and fully operational	☐	☐	☐
R.	Verify that the aerial lift has a fully functional back-up alarm	☐	☐	☐

Print Name of Individual Inspecting Aerial Location Date Lift | Location | Date

Heat Stress Prevention Form

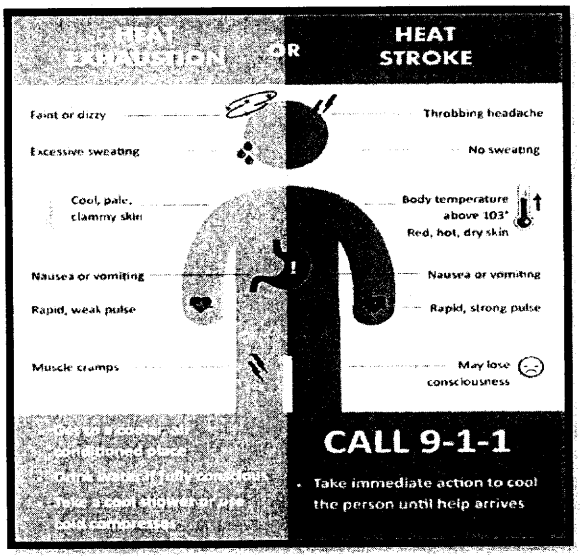
This form is to be used when the Expected Heat Index is above 91 degrees F. Keep the form with project documentation.

Project Location:_____

Date:_____Project Manager:_____

Expected High Temp:_____Expected High Heat Index:_____

1. Review the signs of Heat Exhaustion and Heat Stroke
2. If Heat Index is above 91 degrees F:
    a. Provide cold water and/or sports drinks to all field staff. Avoid caffeinated drinks and energy drinks which actually increase core temperature. Bring no less than one gallon of water per employee.
    b. If employee are dehydrated, on blood pressure medication or not acclimated, ensure they are aware of heightened risk for heat illness.
    c. Provide cool head bands, vests, etc.
    d. Have ice available to employees.
    e. Encourage work rotation and breaks, particularly for employees working in direct sunlight.
    f. Provide as much shade at the jobsite as possible, including tarps, tents or other acceptable temporary structures.
    g. PM should interview each field staff periodically to look for signs of heat illness.
3. If Heat Index is above 103 degrees F:
    a. Employees must stop for drinks and breaks every hour (about 4 cups/hour).
    b. Employees are not permitted to work alone for more than one hour at a time without a break with shade and drinks.
    c. Employees should wear cool bands and vests if working outside more than one hour at a time.
    d. PM should interview each field staff every 2 hours to look for signs of heat illness.



MONTROSE ENVIRONMENTAL

Montrose Air Quality Services
Extended Hours Safety Audit

Project Number:_____ Date:_____ Time:_____

Whenever a project is going to extend past a 14-hourwork day, an Extended Hours Safety Audit to access the condition of their crew and the safety of their work environment must be completed. If a senior tech or a FPM is leading a project, they should confer with the CPM but they will need to get permission to proceed from the DM or RVP. CPMs need to get permission to proceed from the DM or RVP. Technical RVPs can authorize moving forward if they are in the field or if they own the project. DMs and RVPs may make the call in the field.

☐ Hold test crew meeting. Test Crew Initials:

"Extended or unusual work shifts may be more stressful physically, mentally and emotionally. Non-traditional shifts and extended work hours may disrupt the body's regular schedule, leading to increased risk of operator error, injuries and/or accidents."

The test leader should look for signs of the following in their crews:

- Irritability
- Lack of motivation
- Headaches
- Giddiness
- Fatigue
- Depression
- Reduced alertness, lack of concentration and memory

The test leader should assess the environmental and hazardous concerns:

- Temperature and weather
- Lighting
- Climbing
- Hoisting
- PPE (respirators, ect.)
- Pollutant concentration in ambient air (SO_2, H_2S, ect.)

☐ Notify DM or RVP Name:

The test leader must contact either the DM or RVP to discuss the safety issues that may arise due to the extended work period. During this time, they can come to an agreement on how to proceed.

Things to discuss are why the long hours?
Client or our delays?
Production limitations?
Impending Weather?

☐ Contact client

The test leader, DM or RVP should discuss with client any of our safety concerns, the client's needs and come to agreement on how to proceed. Discussion should also include the appropriate rest period needed before the next day's work can begin. The DM and/or a RVP must be kept in the loop on what the final decision is.

What was the outcome?

SAFE WORK PERMIT

A. WORK SCOPE (to be completed by MEG) – Check relevant box(es) to indicate type(s) of work.						
□ Hot Work	□ Line Break	□ Lock-out Tag-out	□ Other		**Permit Timing**	
Specific Location:					Date:	Time:
Equipment Worked On:					**Valid Until**	
Work to be Performed:					Date:	Time:

B. POTENTIAL HAZARDS (To be completed by MEG)			
□ Flammable	□ Harmful to breathe	□ Harmful by Skin Contact	
□ Verify process hazards have been reviewed			
C. PERSONAL PROTECTIVE EQUIPMENT (Check all additional equipment that is required)			
o Tyvek Suit	o Hearing Protection	o H2S Monitor	o Flash Hood
o Rain Gear	o Goggles	o Safety Harness & Life Line	o Life Vest
o Chemical Resistant Gloves	o Face shield	o Tripod ER Escape Unit	o Supplied Air Respirator
o Rubber Boots	o Organic Vapor Respirator	o Fall Protection Equipment	o Dust Respirator
o Other:			
D. CHECK LIST (Check what has been completed)			
o Joint Job Site Visit	o Electrical Isolation Completed	o Line Identified	o Equipment Water Flushed
o Equipment Depressurized	o Isolated and locked out	o Equipment Identified	o Equipment Inert Gas Purged
o Vents Opened & Cleared	o Blinds in Place	o Electrical Equipment Still Live	o Written JSA Completed
o Atmosphere Tested	o Electrical Equipment Still Live	o Equipment Still Live	o
Other:			
E. PRECAUTIONS (Check what must be completed PRIOR to commencing work)			
o Cover Sewers	o Scaffolding Inspection Done	o Charged Hose/Area Wet	o Communication Device(s)
o Air Mover (Grounded)	o Fire Extinguisher	o Covered Cable Trays	o Fire Watch
o Barricade/Signs	o Fire Resistant Blanket	o Continuous Air Monitoring	
o Other:			
o Designated Fire Watch Individual and Start time (30 min after hot work):			
o Fire Watch Complete (signature and time):			

F. HAZARD ANALYSIS (add additional information to form as necessary)

	Job Steps	Potential Hazards	Hazard Controls
1.			
2.			
3.			
4.			

I VERIFY THAT THE ABOVE CHECK LIST "D" HAS BEEN COMPLETED, ALL OTHER CONDITIONS ("B", "C", "E", "F") ARE UNDERSTOOD AND WHEN MET, THE AREA IS SAFE FOR WORK TO COMMENCE.

Name:	Signature:	Date:	Time:

THIS IS THE LAST PAGE OF THIS DOCUMENT

If you have any questions, please contact one of the following individuals by email or phone.

Name: Mr. David Wonderly
Title: Client Project Manager
Region: West
Email: DWonderly@montrose-env.com
Phone: (714) 279-6777

Name: Mr. Matt McCune
Title: Regional Vice President
Region: West
Email: MMccune@montrose-env.com
Phone: (714) 279-6777